

Railway Age Gazette

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Railway Age Gazette

Volume 63

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There is in the official family of every railroad a man the importance of whose duties has in a great many cases been overlooked. He is the road foreman of engines. Too often he is sidetracked from his work of educating and supervising the work of enginemen and assigned to special work which could be

Capitalize the Road Foremen of Engines He is the road foreman of engines. Too often he is sidetracked from his work of educating and supervising the work of enginemen and assigned to special work which could be done as well by others who have less important duties to perform. The demand for power and the extremely high prices for fuel, demand that both the engines and the fuel be made to produce the greatest possible amount of work. The place for the road foreman is on the road to see that this is done. He should not be given too large a territory; in fact, his territory should be reduced and new road foremen added so that the increased number of trains can be properly covered and the new men that are being placed on the locomotives can be properly instructed. With the demand for the more effective use of power the road foreman has become a more important member of the operating department. He is in a position to save considerable money for his road and to serve his country by increasing the efficiency of our great transportation system. His work is on the firing line and it is there he can do the most good.

Safety all the Time "Cut out the elementary stuff!" This sharp admonition was addressed to the members of the National Safety Council at their meeting in New York last week, after some rather lengthy papers had been read. The words were noticeable because—not alone in this but in some other railroad associations—so many members feel the need of such cutting but are too modest to suggest it. In this case the speaker was W. C. Wilson, formerly claims attorney of the Delaware, Lackawanna & Western, but now in private practice. Mr. Wilson always was plain spoken; but yet it is pertinent to observe in this place that the man who has left the railroad service often is the one who has a special mission (or at least a fine opportunity) to tell railroad people some things which they ought to be told but which, because of conventional modesty, tend to go forever unsaid. "You men are experts," said Mr. Wil-

son; "you cannot afford to spend your time on so many things already well known; concentrate on those difficult questions which cannot be settled at home, but on which light may be turned by specific discussion here." The report of the meeting, in this issue, will be found to cover a wide range of details. It is noticeable that "safety first" is not so common a phrase as it used to be. It is safety all the time. These specialists no longer deal so much in phrases. They act. For example, the motion-picture show on the New York Central is not a mere entertainment; attendance by employees is compulsory. That road believes it profitable to have a safety specialist (devoting his whole time to the work) on every division; and that is now the company's policy.

Some time ago Colonel Charles D. Hine wrote an article for the *Railway Age Gazette* advocating simplified station

A Simplified Auditing Method accounting. It called forth some discussion from men in the accounting department, the principal objection to it being that under Colonel Hine's plan no adequate check was had on the agent. The Boston & Maine has now adopted a method of auditing which actually in practice simplifies the work of the agent in making reports to the auditor of the freight revenue's office, and at the same time enables the auditor to have an actual daily balance with agents. Many roads have theoretically a daily balance with the agents, but in practice very often this is only a theoretical and not an actual daily balance. The Boston & Maine had been prior to March, 1917, on a monthly, manual basis of auditing freight revenue. It changed over to a daily basis, installing machines for doing much of the work that had heretofore been done by hand. The underlying principle adopted was to take away from the agent just as much of the audit office work as possible. Much of that which was taken away by the adoption of the new system had previously been done by the agent and then done over again in the audit office. At the larger stations it was in many cases possible to take off one man from the agent's force. At the smaller stations the agent, relieved of this work, properly

belonging to the audit office, has just that much more time for soliciting business, or for other duties which he had been in part neglecting. With the adoption of the new system it was possible to considerably reduce the number of persons employed in the auditor of freight revenue's office and the system has been in operation only since March 1. One of the great difficulties in having a reform adopted on a railroad, even when its advantages are obvious, is the reluctance felt by everyone affected to undergo the confusion and extra work of the transition period. It took a good deal of courage and a great deal of dogged persistence to get the new system in working order on the Boston & Maine and all the more credit, therefore, is due to those who actually went through the mill of making the change and to those who had the courage and foresight to authorize it.

RAILWAY OPERATING EFFICIENCY IN JUNE

OPERATING statistics for the month of June for railways having a total of 196,131 miles of line, which are just available, show a remarkable increase in operating efficiency as compared with June, 1916. The revenue freight ton mileage of these roads was 23 per cent greater than it was in June of last year; and they handled this largely increased business with but one-tenth of 1 per cent more miles of line, 1.8 per cent more freight locomotives and 3.2 per cent more freight cars than they had last year. Perhaps what this really means can be best indicated by showing what were the increases in ton miles of freight per mile of line, per freight locomotive and per freight car. The following table gives these statistics for the United States as a whole, and for each of the three large territories—East, West and South:

REVENUE TON MILES PER MILE OF LINE				
	United States	East	South	West
June, 1917	165,600	315,500	151,800	98,300
June, 1916	134,500	264,200	129,000	74,100
Increase	31,100	51,300	22,800	24,200
Per cent increase.....	23.1	19.4	17.6	32.7

REVENUE TON MILES PER FREIGHT LOCOMOTIVE				
	United States	East	South	West
June, 1917	1,182,000	1,326,000	1,091,000	1,048,000
June, 1916	977,000	1,129,000	944,000	807,000
Increase	205,000	197,000	147,000	241,000
Per cent increase.....	21.0	17.4	15.6	29.9

REVENUE TON MILES PER FREIGHT CAR				
	United States	East	South	West
June, 1917	15,430	14,310	19,000	15,960
June, 1916	12,900	12,350	16,160	12,610
Increase	2,530	1,960	2,840	3,350
Per cent increase.....	19.6	15.9	17.5	26.6

It will be seen that the increase in freight traffic in the country as a whole per mile of line was 23 per cent; per freight locomotive, 21 per cent; and per freight car, 19.6 per cent. The increase in freight car efficiency was partly due to an increase in the average miles moved by each car daily from 27.3 to 29.1 miles; partly to an increase in the average load of loaded cars from 25.2 to 27.9 tons. The average miles made per locomotive per day increased from 65 to almost 78; the average tons per train from 642 to 715.

Relatively the largest increase in traffic took place in western territory, the total ton mileage exceeding that of June, 1916, by almost 33 per cent. This is reflected in the statistics of operating efficiency, the increase in traffic handled per mile of line in that territory being 32.7 per cent; per freight locomotive, 29.9 per cent, and per freight car, 26.6 per cent.

These increases in operating efficiency are truly extraordinary. They illustrate strikingly what American railways can do when they are allowed to work together without fool-

ish interference under the anti-trust law, and when they are able to get the cordial co-operation of most of their employees and of the shipping public.

Freight traffic continues to increase, the increase in June being the largest yet recorded in any single month, and in addition the passenger business now being handled probably is the largest ever known. How long can the railways continue to augment their efficiency enough to meet the demands upon them? The results they have secured already are greater than any but the most hopeful anticipated; and in view of what they have done already, there seems more ground for optimism regarding how they will get through the next fall, winter and spring than there ever was before.

MISSOURI, KANSAS & TEXAS AND ST. LOUIS-SAN FRANCISCO

THE St. Louis-San Francisco has been out of the hands of the receivers since November, 1916, and the Missouri, Kansas & Texas is now in the process of reorganization, the road being operated by a receiver. There has developed a rather wide difference of opinion as to what interest charges should be placed upon the Missouri, Kansas & Texas in the reorganization. Naturally comparisons with other roads have been used pro and con in the reorganization negotiations. There are hardly any two roads in the United States which are so nearly alike in operating conditions, traffic, etc., as to permit of a point to point comparison without qualifying analysis. Certainly the Missouri, Kansas & Texas and the St. Louis-San Francisco are not so much alike as to permit of such an unqualified comparison. On the other hand, it is interesting and not unprofitable to place the figures for one road against those of another even if it serves no other purpose than to call to each man's mind explanations of differences or similarities.

It may be said at once that the interest charges on the reorganized St. Louis-San Francisco are higher than any one interested in the Missouri, Kansas & Texas reorganization proposed to place on that property. They amount to \$1,618, whereas the higher figure which has been advocated for the Katy is \$1,159 per mile and the lower figure \$998 per mile.

It should be mentioned here that the St. Louis-San Francisco is making a very good showing indeed, having gross in the calendar year 1916 amounting to \$52,699,000, and after paying expenses, taxes and rentals it had \$14,638,000 available for interest, whereas the capitalization of the new company calls for \$8,506,000 fixed interest, \$2,322,000 cumulative interest and \$2,112,000 interest on income bonds. The company therefore earned \$1,698,000 above all three classes of interest charges.

The St. Louis-San Francisco operates 5,265 miles; the Missouri, Kansas & Texas 3,865 miles. The main north and south lines of the two systems serve the same territory, as will be seen from the map; but a list of mileage by states is illuminating:

State	St. L.-S. F.	M. K. & T.
Alabama	132	—
Arkansas	601	—
Louisiana	—	19
Kansas	630	494
Missouri	1,720	543
Mississippi	143	—
Oklahoma	1,408	1,036
Tennessee	18	1,773
Texas	505	—

It is apparent that the Katy has no line comparable to the Birmingham line of the Frisco, and this fact will be emphasized in a comparison of commodities carried. It will be noted that the Frisco has only about as much mileage in Texas as the Katy has in Missouri, while the Katy has as much mileage in Texas as the Frisco has in Missouri. This should be borne in mind especially when discussing comparative costs of injuries to persons and loss and damage payments. The Frisco has somewhat larger mileage in Okla-

homa and the Katy was comparatively a late comer in that state.

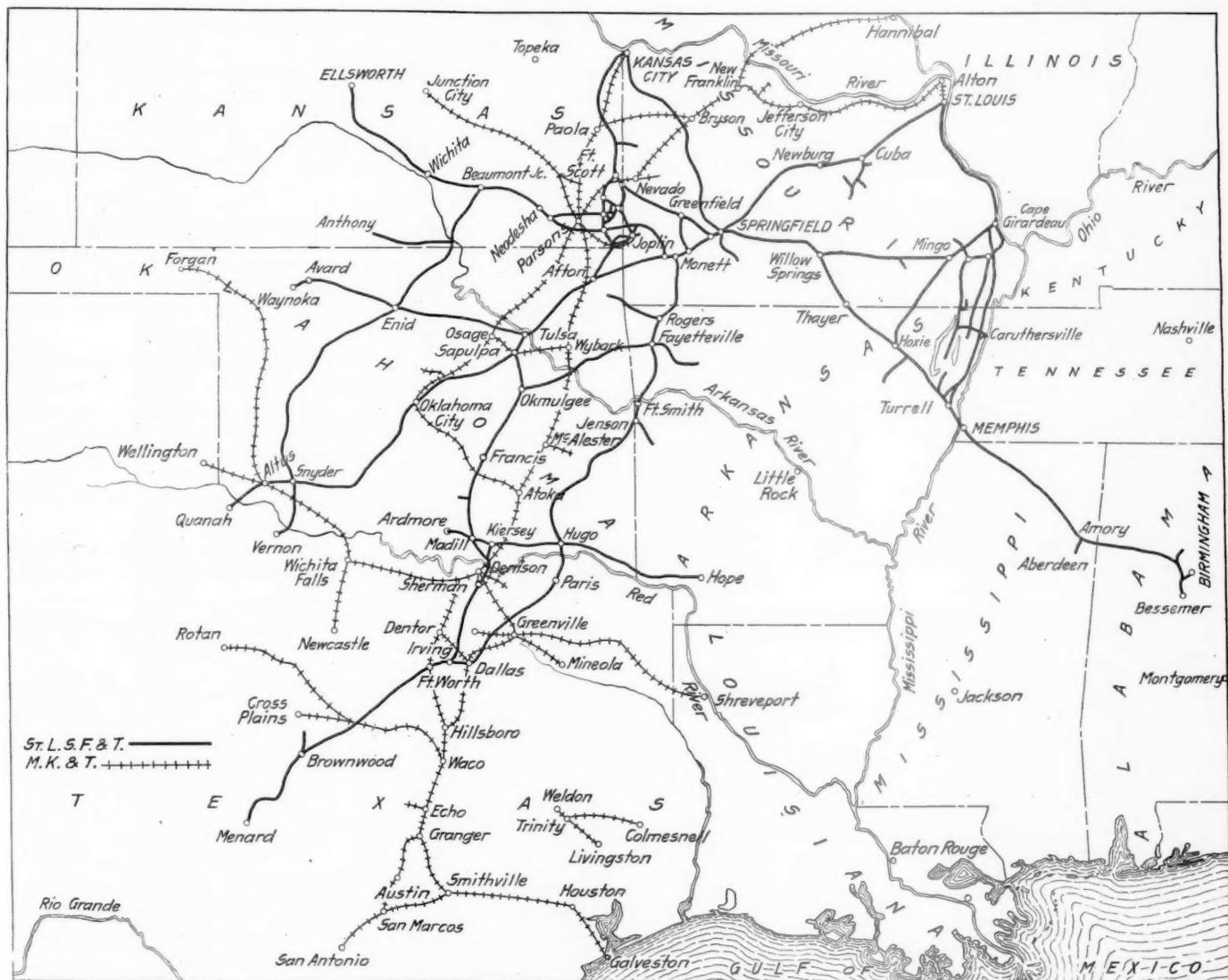
In 1916 the Frisco carried 21,270,000 tons of freight, and the Katy, 11,126,000 tons. The fact that there is no such contrast as this between gross operating revenues per mile (Frisco earned \$10,106 per mile in 1916 and the Katy \$9,504 per mile) is explained by the longer average haul of freight on the Katy—217 miles—as compared with the Frisco—174 miles. A contrast of the tonnage of the different commodities carried explains in part differences in average trainloading and resulting differences in transportation expenses:

Commodities	St. L.-S. F.	M. K. & T.
Agricultural products	3,317,000	2,453,000
Animal and animal products	702,000	552,000
Products of mines	8,660,000	4,531,000
Lumber and forest products	3,067,000	842,000
Manufactures	4,137,000	1,938,000
Miscellaneous	353,000	211,000
L. C. L.	1,034,000	598,000

The Alabama line of the Frisco accounts in good part for the much larger coal and ore tonnage which permits of heavy

which can be used to fill out engine ratings and is therefore of great help in bringing up the average trainload. The Katy badly needs a northbound drag tonnage traffic. Both roads reach Kansas City and St. Louis; Oklahoma City, Okla.; Sherman, Tex.; Dallas, Tex., and both roads serve in general the territory between Kansas City and Dallas. The St. Louis-San Francisco serves Springfield, Mo.; Memphis, Tenn.; and Birmingham, Ala., a territory not reached in any part by the Missouri, Kansas and Texas. On the other hand, the Katy reaches Waco, Austin, San Antonio, Houston and Galveston and has a line from Dallas to Shreveport.

The Frisco's financial results for the year have been mentioned. The Missouri, Kansas & Texas earned \$36,734,000, an increase over the previous year of 13 per cent, and after paying expenses, rentals and taxes, had \$5,443,000 available for interest. The Frisco operated on a ratio of expenses to gross earnings of 67.11, while the Missouri, Kansas & Texas had an operating ratio of 80.14 per cent. A very considerable part of the difference in operating ratio is ex-



The Missouri, Kansas & Texas and the St. Louis-San Francisco

loading and is therefore a factor in favor of the Frisco in trainloading. The Frisco gets into the lumber country; the Missouri, Kansas & Texas, except its so-called orphan lines, does not get into the lumber country. This is an even more important factor in trainloading than the difference in tonnage of coal and ores. Much of the lumber is not only susceptible of heavy carloading but is drag freight northbound,

explained by the much heavier maintenance of way and maintenance of equipment expenditures of the Katy. That company spent \$7,056,000 on its 3,865 miles of line in 1916 for maintenance of way, while the Frisco spent \$7,403,000 on its 5,256 miles of line. The Katy spent \$7,274,000 for maintenance of equipment; the Frisco, \$9,703,000. There can be little doubt that during 1916 the receiver of the Katy

was taking up delayed maintenance. This was true for both maintenance of way and maintenance of equipment, and in addition there was \$2,286,000 spent on capital account, the largest items being for grading, bridges, rail and ballast. The Frisco went through its period of rehabilitation before it was taken out of the hands of the receiver. A list of improvements is included in the Frisco's annual report, but the amount charged to capital account for such improvements is not given.

In the estimates which have been made of the Missouri, Kansas & Texas future earning power a reduction in transportation costs per ton-mile figures prominently. The St. Louis-San Francisco's ratio of transportation expenses to gross earnings in 1916 was 31.48, comparing with 32.88, the ratio in the previous year. The Missouri, Kansas & Texas transportation ratio in 1916 was 33.74 as compared with 34.99 in 1915. Transportation expenses are not divided in the annual reports of either road as between freight and passengers; but it is interesting to make a rough comparison of transportation costs based on total train mileage because there are two distinct methods of approach in attempting to lower the transportation cost on the Katy. One is to increase the trainload, the other to decrease the costs per train-mile. Very roughly, the Katy had in 1916 15,000,000 train-miles, including both passenger and freight, and the Frisco, 22,000,000. There is some duplication of mixed train-miles in both figures. The Katy's transportation cost per train-mile averaged 82 cents; the Frisco's, 77 cents. The ratio of train-miles on the two roads is, roughly, as 3 is to 4.5.

Applying this ratio to the details of transportation expenses, most of the Katy's expenses are as low, and in some cases lower, than the Frisco's, with three notable exceptions: Fuel, loss and damage, and injuries to persons. Water also costs the Katy more than it does the Frisco. Injuries to persons cost the Katy \$634,000 in 1916 as contrasted with \$524,000, the cost on the Frisco. Loss and damage to freight cost the Katy \$393,000, and the Frisco very slightly less. The larger mileage in Texas in some part explains this contrast. Texas awards against railroads are notorious; but making full allowance for that fact, the Frisco is showing remarkably good results of its efforts to reduce loss and damage claims and claims on account of injuries to persons. It may be that the claims paid by the Katy in 1916 included not only the normal proportion of awards for accidents and losses in the immediate preceding years, but also a certain amount of taking up of delayed payments of awards. At any rate, the Katy is conducting a vigorous safety first campaign now and in a year or two it is not unfair to expect some betterment.

Very roughly, the fuel for train locomotives costs the Katy 17.7 cents per train-mile, and the Frisco, 12.9 cents. There are numerous points of difference between the two roads that would account for a variation in fuel costs. The Frisco has some very steep grades and, on the average, lighter locomotives, and there are many other things that could be mentioned, but as near as can be told from the available data, there is in general an indication that the Frisco is getting cheaper fuel as measured in train-miles than the Missouri, Kansas & Texas, and this actually bulks large in the final results as shown in the income account for the year. The St. Louis-San Francisco has for a number of years had a fuel department which has been given the authority and has taken the responsibility for conservation of fuel, and the results which were obtained in 1916 from almost any way of looking at it are a high compliment to the success of this department. J. W. Kendrick, one of the experts who made a report on the Missouri, Kansas & Texas for use in the reorganization, figured that \$500,000 could be saved on the Katy by a change in methods of handling fuel and the establishment of a fuel department. There is no method of judging the accuracy of Mr. Kendrick's figure, but it would appear

as if the Frisco, which had established such a department, was showing results that would appear to justify its existence. In comparing train-mile transportation costs it should be pointed out, of course, that the Frisco and the Missouri, Kansas & Texas do not have the same proportion of passenger train mileage to total train mileage. The Katy's passenger train mileage, including mixed train mileage, was 8,029,000, and the freight train mileage, also including mixed train mileage, was 7,144,000. The Frisco passenger train mileage, excluding mixed, was 10,065,000, and the freight, excluding mixed, was 10,551,000.

Stress is laid in the Kendrick report on the Katy on the possibilities of increasing the trainload. Ever since the present management took hold of the Katy, persistent and well thought out efforts have been made to increase the trainload. In 1916 the trainload of revenue freight averaged 338 tons; on the Frisco the average for revenue freight was 337 tons. Including company freight, the Katy's trainload was 409 tons and the Frisco's 396 tons. The total trainload of the Katy increased a little over 38 tons, or 10 per cent, as compared with the previous year, and the Frisco's trainload increased a little less than six tons, or between one and two per cent. The Frisco has considerably lighter engines on the average than the Missouri, Kansas & Texas. On the other hand, the older engines of the Missouri, Kansas & Texas are a pretty poor lot. The average weight on drivers for the Frisco engines was 69 tons, and the Katy's, 71 tons. The Katy has 105 comparatively new Mikados. It also has, however, in freight service 204 Moguls. The Frisco has in service 353 ten-wheel locomotives and 212 Consolidations. The company is now receiving, however, from the builders, 60 new Santa Fe locomotives for freight service and 10 Pacific locomotives for passenger service. When these engines have all been delivered the average weight on drivers for the Frisco's locomotives will be 73.7 tons.

It may be a considerable time before the Katy can get any large number of new modern locomotives to replace its Moguls. The increase in trainload in recent years has been in part due to better supervision and in part to the heavier locomotives. The increase which the road should show, however, in the next few years is in good part dependent on traffic developments. If the road can build or get a connection between its main lines and its two "orphan lines" there is the possibility of developing considerable lumber traffic. This would help the average trainload greatly, but it would mean the expenditure, presumably, of considerable capital amounts. Under the handicap of recent traffic conditions the Katy's showing, an increase in trainload from 266 tons in 1911 to 409 tons, is thoroughly creditable. The Frisco may hope to get a better trainload after its new locomotives have been broken in.

The following table shows the results of operation for the Katy in the calendar year 1916 and 1915, and for the Frisco for the calendar year 1916 with such comparisons for 1915 as are available:

	M. K. & T. 1916	Frisco 1916	M. K. & T. 1915	Frisco 1915
Mileage operated	3,865	5,256	3,865	.....
Freight revenue	\$24,795,720	\$36,555,444	\$22,142,576	.....
Passenger revenue	9,215,627	13,113,728	7,966,913	.....
Total operating revenue ..	36,733,682	53,119,999	32,453,462	.....
Maintenance of way and structures	7,635,695	7,403,385	5,277,655	\$6,697,022
Maintenance of equip- ment	7,273,804	9,703,458	4,657,977	7,241,338
Traffic expenses	725,564	862,644	658,523	842,290
Transportation expenses ..	12,400,521	16,721,227	11,494,485	14,636,241
General expenses	1,169,910	1,417,646	1,047,282	1,221,665
Total operating expenses ..	29,439,701	35,646,779	23,223,816	30,372,891
Taxes	1,546,659	2,175,532	1,537,369	.....
Operating income	5,747,322	15,280,127	7,692,277	.....
Gross income	6,143,712	15,781,864	7,921,964	.....
Net income	*\$134,634	\$131,976	*\$14,881	.....
Surplus after payment of cumulative and income interest .....	.....	1,698,443	.....	.....

* After deducting interest charges on outstanding securities, including those in default as well as those which were paid.

† After deducting fixed interest charge only without any charge made for cumulative interest.

‡ Deficit.



The Fifteenth Engineers, since in France, pose in front of their Y. M. C. A. Tent at Camp Gaillard.

Y. M. C. A. Workers on 800 Trains to Cantonments

**By This Step the Railroad Department Completes a
Y. M. C. A. Chain From Home to Front Line Trench**

BY the time this is in print the movement will be under way of the second contingent of 40 per cent, or 194,800 men, of the National Army to the cantonments. These men will move in several hundred trains and on trips that will range from a matter of three or four hours to possibly 24 or 36 hours. On each and every train insofar as it is possible (and it is counting on accompanying 700 to 800 of them) the Railroad Y. M. C. A. will have a secretary or a member of his staff who will be of whatever service he can to the men. Through this important bit of work, the National Army men will first come in contact with the far reaching war work that is now being so energetically carried on by the Y. M. C. A. It is this link also that will complete the chain that will enable the Y. M. C. A. to keep in closest touch with the men who will go forth to uphold America's honor, from the time they leave their homes until they return victorious; or while they are on the train, in cantonment, or camp, on the train once more, in the embarkation port, on the transport, in London, in Paris and up to the fighting front.

The work which the Y. M. C. A. through its War Work Council, is now preparing to do for the men in olive drab, will therefore not by any means be confined to the National Army or National Guard cantonments or to camps for our forces overseas. There will be a lot to do between the time the men leave their homes and their arrival at the cantonments and at the time, when as trained men, they leave the camps to board the transports for their journey overseas. This particular part of the work is most important, and for the reason that it is a transportation matter, it is natural that it should have been placed in the hands of the Railroad Y. M. C. A.

In an article that appeared in the Patriotic War Number of the *Railway Age Gazette*, June 22, 1917, John F. Moore, general secretary of the Railroad Department of the International Committee of the Young Men's Christian Association outlined the part that the Railroad Department expected to take in the war work. Part of this program is already under way; other parts of it are now in preparation and await only the time of action.

The Railroad Department of the Y. M. C. A. did extremely good work among the National Guardsmen that were not so long since to be seen guarding railway bridges,

viaducts and tunnels. It filled a very important niche at the camps of the nine railway engineer regiments, and trained secretaries have since accompanied these railway regiments to France, where men and secretaries both are now getting into the swing of things. The Railroad Department also assisted materially and is continuing to assist considerably in the way of caring for the comfort of troops on their way to camp either as they pass through junction points or other important railway centers, or when they have to leave the trains and encamp for a time near a Railroad Y. M. C. A. The Railroad Department has representatives at important embarkation points to shake hands with the men and wish them *bon voyage*. As this is written, it is arranging to have secretaries on trains carrying men of the National Army to their respective cantonments, and by the time this is in print, no small amount of this work will have been done.

IN CAMP WITH THE RAILWAY ENGINEERS

When the nine railway engineer regiments were in camp near the several cities where they were recruited it was the Railroad Y. M. C. A. that supplied the men with writing paper, postage stamps, checkerboards and other such conveniences. In cases where the regiments were not in buildings, a Y. M. C. A. tent was put up. A railroad secretary and his assistants at each camp attended to providing tables, chairs, a piano, and a phonograph. Classes in French were conducted. Many an otherwise tedious evening was sped quickly on its way by an entertainment arranged by this secretary, and many a Sunday afternoon was put to better uses by an interesting and well attended religious meeting.

Railroad officers keenly appreciated the work done by the Railroad Y. M. C. A. for the men in the engineer regiments from their railroads. "I was at the camp (of the Fourteenth Engineers at Rockingham Park, Salem, N. H.) many times," wrote President J. H. Hustis, of the Boston & Maine, "and saw what was being done. You can't overstate the benefits nor the results. The work of Secretary _____, loaned by the Railroad Association, is deserving of the highest praise. I am led to express on behalf of the executives of the railroads of New England,—and I think I can also speak for the men—their thanks for what was done."

The men in the engineer regiments can tell of many instances in which the Railroad Y. M. C. A. secretary helped

them over a rough spot. He sent money home for them; in a number of cases he helped men make their wills and in one of these latter cases, through the assistance of a railroad secretary in another city, he arranged also for an executor. These railwaymen are now in France, helping to construct, operate and repair railroads behind the lines. Trained secretaries have gone and more will go to continue the Y. M. C. A. work among them for the men will welcome the Railroad Y. M. C. A. there just as much and more than they welcomed it on their own home line. The first of the Railroad secretaries to go abroad was Frank G. Smith who is now in France. Mr. Smith has been with the Young Men's Christian Association for 12 years and served as railroad secretary at several New York points. He was later in charge of the Y. M. C. A.'s authorized by the government during the building of the Panama Canal and upon his return became social secretary at the New York Central Y. M. C. A. in New York City.

AT TERMINALS AND JUNCTION POINTS

The work that has been and is being done at terminals, junction points and other railroad centers consists principally of opening the association buildings to the men in uniform free of charge. They are granted the full use of tables, pens, ink and stationery, as also of the restaurant and baths. "Welcome, Soldier Boys. Everything We Have is Yours. Come in," said the big sign in front of the Y. M. C. A. across from the armory in one city, and, according to the reports, they certainly did.

This work of meeting the men at junction points will grow



F. G. Smith

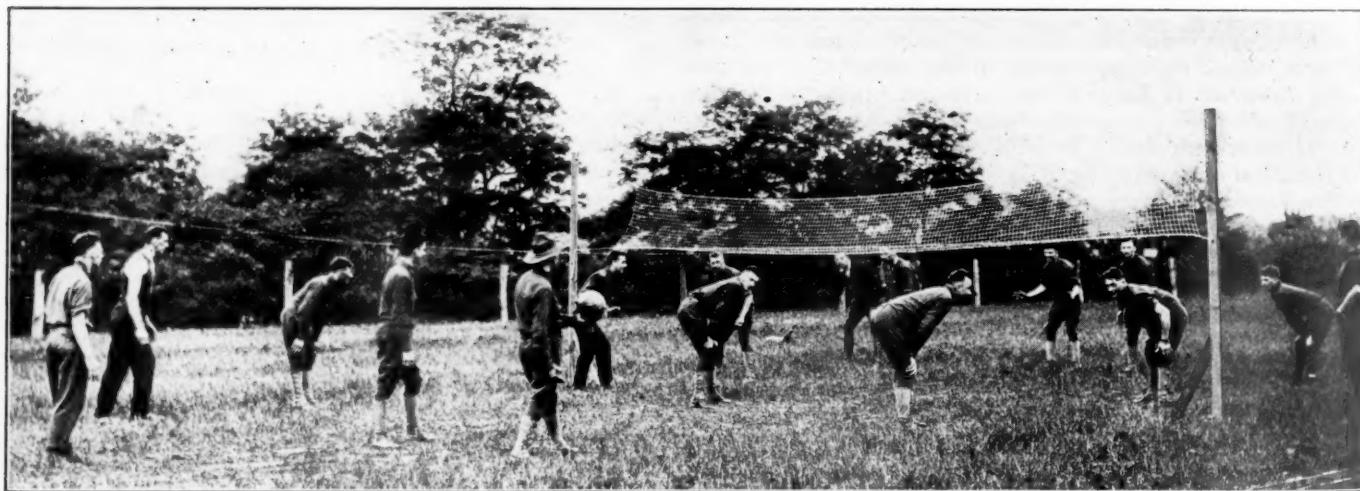
Humphrey, general secretary of the Railroad Y. M. C. A. in that city. Dr. Humphrey has recently been made a member of the local committee of the Railroad's War Board at that point. Troop trains through St. Louis will probably not be passed through the Union Station but will be transferred from one railroad to another in some of the outlying railroad yards. Whenever it is possible, organizations and individuals will be afforded opportunity to distribute box lunches or other gifts among the soldiers and Dr. Humphrey will pay particular attention to looking after the welfare of the troops while the trains are being cleared through this gateway, and through him the work of the various organizations will be co-ordinated to the best advantage.

AT PORTS OF EMBARKATION

Perhaps one of the most interesting aspects of the work is that now being carried on at the ports of embarkation. The work of the Railroad Y. M. C. A. secretary on duty on the piers is uncertain to say the least, for he is very unlikely to know when the trains will arrive, or how many men they will bring until the trains are in; and then he must hustle with unseemingly speed. On the other hand, he is just as unlikely to know when the boats will sail. Even with these handicaps, however, the secretary at the most important of the Atlantic Ports is making records every day. As soon as he hears that a train is in he immediately looks it up. If the men are likely to leave the train and wait at the station for a time, he will set up quarters, perhaps in the immigration room, for the railroads want to help him whenever they can. In some cases the men will move right



Dr. Rubens Humphrey



The Y. M. C. A. Encourages Outdoor Recreation

more important from day to day as the new contingents of National Army men go to their cantonments and as they and the members of the National Guard later leave the cantonments to go to the seacoast. The Railroad Y. M. C. A. is making extra efforts to see that the men are well taken care of. In St. Louis the work will be in charge of Dr. Rubens

on to the embarkation piers after a very short stopover. Perhaps they have not been fed for many hours. The secretary and his assistants promptly get on the job and secure sandwiches for them. In one case no less than 500 were served in 20 minutes, from the railroad station restaurant as it happened, and were sold to the men at cost price. This assist-

ance was certainly appreciated (by both the men and the regiment's commander) for the troops had not eaten for several hours and time was too short to allow them to leave.

A considerable part of this secretary's work comes when the men are at last on board the big transport. First, of course, he secures permission from the commanding officer to work among the men. Then armed with passes and permissions, and dressed in a field gray Y. M. C. A. uniform, designated by a red triangle inside a circle on the sleeves and



Writing Letters and Catching Up With the News

the letters, R. R. Y. M. C. A., across the shoulder straps, he gets to work. He has specially printed stationery which is furnished to the men free of charge, post cards, stamps and writing materials. Very often when they are available he distributes magazines and books, and he does not have much of a job giving them away. When he puts them down on the deck, the scene that usually follows closely resembles a bunch of small street urchins scrambling for pennies. If the men are to be in the harbor for a time, he arranges an entertain-



The Y. M. C. A. Stages an Entertainment

ment and very often a religious meeting. He and his assistants help the men in many other ways.

One soldier wanted to send \$25 home to his wife. Still another soldier found out at the last minute that his mascot dog would be persona non grata in France; the secretary arranged to crate the animal and ship him home safely by express. The soldiers appreciate all these things, and most of all do they appreciate the chance to say good-

bye to some one. It is only a little thing, but a soldier going overseas feels much easier at heart for a last handshake, or the last "*bon voyage*."

FROM HOME TO CANTONMENT

The National Army will move to its cantonments, 5 per cent from September 5 to 9; 40 per cent from September 19 to 23; 40 per cent from October 3 to 7, and the remaining 15 per cent beginning October 17. The Railroad Y. M. C. A. is going to be on hand when these various contingents board their trains and a railroad secretary or a member of the secretary's staff will, if possible, accompany each and every train. He will be designated by an armband bearing the letters R. R. Y. M. C. A. and will have stamps and stationery, song sheets and magazines and little Protestant and Catholic Testaments, and possibly Hebrew prayer books.

In addition to supplying the prospective soldiers with these things, he will tell them something about the welfare work in the cantonments to which they are going and the name of the Y. M. C. A. secretary. The men will thus get their first introduction to the advantages of keeping in touch with the camp Y. M. C. A. work.

The pocket Testaments are not given out promiscuously, but only to interested men, who, seeing them, ask for one. They are well worth asking for, for they have been specially prepared for the soldier's use. The Y. M. C. A. at the camp in addition to its program of service to the men, will help to carry on the active religious work taking the place of that done by the churches at home; the Railroad Y. M. C. A. secretaries will therefore be the connecting link between the two. Both have a big work ahead of them, but any one who has come in contact with the enthusiasm that characterizes the Y. M. C. A. at the present time will have no doubt that its efforts will be highly successful and amply repaid.

RAILWAY STATION CAB TOLLS IN ENGLAND.—A long-standing difference between cabdrivers and the railway authorities came to a head recently when the London & Provincial Union of Licensed Vehicle Workers, acting on the instructions of their executive, issued a notice calling on all cabdrivers on and from August 1 to abstain from paying the penny cab toll demanded by railway companies from cabmen who ply for hire within London stations. On that date much inconvenience was caused to the traveling public, as the taxicab drivers refused to pay the penny toll demanded of them, and the ranks inside the stations were empty. Both the drivers and the railway companies express their intention not to give way. The latter say that the charge was fixed by the Home Secretary under an Act of Parliament in 1907, and was willingly agreed to by the cabmen of that day as a substitute for the old system of privileged cabs.

WAR SERVICE OF BRITISH RAILWAYS.—Apart from securing prompt and expeditious conveyance of traffic, the government has been assisted by the railways in a variety of other ways. Large numbers of railway-owned steamers have been taken by the simple expedient of commandeering; rolling-stock and permanent way have been sent overseas; railway workshops have been at the disposal of the state for the manufacture of munitions of war in great varieties; permanent way and other work in connection with munitions and other depots has been undertaken for the government by the railways. The services of various general managers and other officers have been placed at the disposal of the government for special duties (e. g. Sir Eric Geddes, K. C. B., Sir Guy Granet, Sir Sam Fay, Mr. Guy Calthrop, and others); over 150,000 railwaymen have been released for service with the colors, and generally every effort has been made to assist the government to the greatest possible extent.—*Engineering, London*.

Byram to Succeed Earling as Head of St. Paul

His Will Be Great Task of Securing Hoped for Results From Pacific Coast Extension and Electrification

HARRY E. BYRAM, vice-president in charge of operation of the Chicago, Burlington & Quincy, will be elected president of the Chicago, Milwaukee & St. Paul at a meeting of the board of directors of that company the latter part of this month.

Mr. Byram will then have risen in eight years from the office of general superintendent of the Burlington lines West of the Missouri river to the position of chief executive officer of a great transcontinental system operating over 10,000 miles of line, and earning over \$100,000,000 a year.

While his rise has been rapid, there has been nothing adventitious about it. It has been partly due to the particular training and experience he has had, and partly to the ability and energy of the man himself. It was this combination which made him just the man that the controlling interests of the St. Paul road felt they needed when they decided that some change in management was desirable.

Mr. Byram's training and experience have been secured mainly on railways on which the policies and methods originated chiefly by James J. Hill have prevailed. Mr. Byram became a clerk in the office of the general manager of the Great Northern in 1898, and served in the operating department of that road until 1902, during which time he had risen to a superintendency. After spending two years on the Rock Island he went to the Burlington, which had then become a Hill property, and served first as general superintendent, and then as assistant to Daniel Willard, who was then vice-president in charge of operation. It was during this period that Mr. Hill was carrying out the reorganization and improvement of the Burlington system which was needed to enable it to operate in accordance with his ideas as to the way a railway should be operated.

Mr. Byram, since he became vice-president in charge of operation in 1910, has shown himself a worthy pupil of Mr. Hill and a fitting successor to Mr. Willard. Between 1901 and 1910 the Burlington's revenue ton miles had increased 92 per cent, while its average train load had been increased so much that its freight train mileage had increased but 1 per cent. Between 1910 and 1916 the average train load was increased from 381 tons to 575 tons, or over 50 per cent. In the same period the average tonnage per car was increased from 17 tons to 20.53 tons, or 21 per cent; and during the last year further large increases in carloads and trainloads have been achieved. In 1910, the ratio of operating expenses to earnings was 72 per cent. It has never reached that figure since, and in 1916 was only

60 per cent. The conducting transportation ratio in 1910 was 32 per cent; in 1916, only 29 per cent. The percentage earned on the common stock increased meantime from 13 per cent to 27 per cent; and surplus earnings in 1916 were almost three times as great as had ever been known before, being almost \$15,000,000. The showing made thus far in 1917 is even better than that for 1916.

These great advances in operating efficiency have been made possible by the exercise of great foresight in the development of the property and by the application of sound

principles in its general management by the two presidents under whom Mr. Byram has served since he has been vice-president — Darius Miller and Hale Holden. But they would not and could not have obtained without a strong man such as Mr. Byram at the head of the operating department. In fact, Mr. Byram has made himself recognized by the railroad fraternity during recent years as one of the most consummate masters of the entire art of railroad operation that the country has produced. His knowledge of the technique of railway operation is complete, and his ability to grasp and assimilate all the innumerable details of the business is extraordinary. He is physically strong, he takes good care of himself, and in consequence he is able to, and does, give to his work an amount of industry and energy that few men are capable of putting forth. An intense worker himself, he expects and receives somewhat similar work from his subordinates all along the line.

While Mr. Byram is so skilled as an operating man, he has taken a very keen and broad interest in all matters affecting railway management and the railway situation in general.

Mr. Byram not only knows how to operate a railway, but he has the vision and imagination necessary to see how a property should be developed in order that it may be successfully operated. In order to secure the good operating results which have been achieved on the Burlington, there was requisite not only careful supervision of carloading and trainloading, but even more reductions of grades, the construction of cut-offs, the development of sidetracks and terminal facilities, the acquisition of larger cars and more powerful locomotives, the maintenance of roadbed and equipment to high standards; and it has been largely due to the attention given to these matters that the Burlington has made a showing better than that made by the St. Paul, for example.

Meantime, Mr. Byram has taken great interest in all matters pertaining to the public relations of the railways.



H. E. Byram

He is a strong believer in giving the public good service at reasonable rates, and then tactfully but vigorously resisting all the attacks that are made upon them and answering all the misrepresentations that appear about them. While he has a great reputation as an operating officer, only those who have come into intimate contact with him realize the breadth of his knowledge of and interest in railway affairs of all kinds and also public affairs in general.

Mr. Byram is sometimes characterized as "cold," but the impression that he is so, insofar as it prevails, evidently is due to the fact that in his business relations he seems to act uniformly upon the principle that he is a trustee for his railroad, and that his main duty is to get the best bargains and the best results he can for its stockholders, consistent with fair treatment of others. As a matter of fact, he is personally extremely democratic, warm-hearted and companionable, and in consequence is very popular among the people who know him well.

The combination of training, experience, ability, energy, public spirit and personality which Mr. Byram possesses seems peculiarly to equip him for the presidency of the St. Paul at this time. The road offers him a great opportunity, and developments on it under his management will be watched with much interest. A man with his training, experience, and temperament is pretty sure to apply Hill methods of railroading, and that seems to be what the St. Paul needs.

There is nothing fundamentally wrong with the road, with the strategic lines along which it has been developed, or with its operating organization. In fact, it has in its organization many very strong men. It does apparently need the application of certain principles and methods of development and operation which have been less in evidence in the St. Paul than on most of the more efficiently operated railroads in the territory; and Mr. Byram is the man to apply them.

Mr. Byram was born at Galesburg, Ill., on November 28, 1865, and entered railway service in 1881 as a call boy on the Chicago, Burlington & Quincy in the same city. He was later stenographer in the general superintendent's office and chief clerk to the superintendent of terminals of the same road at Chicago, Ill. From 1889 to 1894, he was out of railway service. From the latter date until March, 1898, he was with the Great Northern as clerk in the general manager's office and chief clerk in the vice-president's office at St. Paul, Minn., following which he was assistant general superintendent of the Montana Central at Great Falls, Mont., and from October, 1899, to October, 1902, superintendent of the Cascade division of the Great Northern at Everett, Wash. From Everett he went to Chicago to enter the service of the Rock Island. From October, 1902, to February, 1904, he was assistant to the first and fourth vice-presidents, of that road at Chicago, and from the latter date until July, 1904, was general superintendent of the southwestern district, with headquarters at Topeka, Kansas. He left the

Rock Island to become general superintendent of the Nebraska district of the Burlington, which position he held until May, 1909, when he was made assistant to the vice-president of operation. Since February, 1910, he has been vice-president.

ALBERT J. EARLING

Albert J. Earling, chief executive of the Chicago, Milwaukee & St. Paul for the past 18 years, who will retire from the presidency at a meeting of the directors of the road the latter part of this month, will be elected chairman of the board. Mr. Earling's entire railroad career of 51 years has been with the St. Paul—a record of continuous service with one road seldom equalled by American railroad executives. Beginning as a telegraph operator on the Milwaukee & St. Paul in 1866, he passed through practically every position in the operating department, becoming vice-president in charge of operation in December, 1895. His rise was steady but not rapid.

The fact that his entire railroad career has been with the St. Paul and that he became familiar, by virtue of experience, with the duties of each office in the operating department from the ground up, has proved of great advantage to him, giving him an unusually thorough knowledge of the property, the affairs of which he so long directed and a comprehensive grasp of the details of its operation. There is no department in which he has not taken a direct interest and there are few subordinate officers with whom he has not kept in close personal touch. He has pursued a policy of personal supervision seldom attempted by the president of so large a property.

The Milwaukee & St. Paul, as it was then known, was organized only three years before Mr. Earling entered the service. When it assumed its present name in

1874 it had about 1,400 miles of line. When Mr. Earling became president in 1899, it had 6,337 miles of line; and it now operates 10,510 miles.

Mr. Earling has launched two daring moves for the property since he has been president. The first, the construction of the Pacific coast extension, was undertaken in 1905 toward the end of a period of prosperity for the carriers and at a time when the epidemic of repressive railway regulation had not yet assumed appreciable proportions. The project was financed before the panic of 1907, and an ensuing period of low prices and low wages proved a favorable circumstance in carrying on the construction work.

The most spectacular undertaking of Mr. Earling's career probably has been the electrification of a large portion of the Puget Sound extension. This was begun in November, 1914, and although other roads had electrified small portions of their lines before that time, none had attempted a venture of such great magnitude. The first unit of 440 miles in the mountain country from Harlowton, Mont., to Avery, Idaho, was completed in February, 1917, and another unit is now in



A. J. Earling

progress of construction from Othello, Wash., to Seattle and Tacoma. It is unfortunate that most of the electrification work has been done in a period of rising prices, increasing wages and soaring interest rates.

When the Pacific coast extension was undertaken, trade in the Northwest was booming and an increasing business was being built up with the Orient and Alaska. The high expectations of traffic from these sources, entertained at that time, have not been realized. The extent to which readjustments in currents of trade at the conclusion of the world war will affect the situation is, of course, an uncertain matter; but while the result of the extension was the opening up of considerable areas of new territory for development, the long period of depression in the Pacific Northwest, which continued until recently, has had an unfavorable effect upon the St. Paul's results.

When Mr. Earling became president of the road in 1899 it was paying, and had been paying for nine years its fixed charges, dividends on its preferred stock, 5 per cent on its common and earning a good surplus. Its financial results so improved under his management that in 1901 the dividend on the common was advanced to 6 per cent, and in 1902 to 7 per cent. This rate was maintained to 1912. In the year 1906 and again in 1907, the surplus after dividends exceeded \$5,500,000.

From this time, however, it began to decline. In 1911 it had dropped to the negligible sum of \$127,000, and in 1912 there was a deficit after dividends of over \$5,000,000. In that year the dividend on common stock was reduced to 5 per cent, and it has been on that basis since. In 1913 a surplus exceeding \$4,000,000 was shown, and in 1914 there was a fair surplus, but again in 1915 there was a deficit after dividends of almost \$2,000,000. In 1916 the surplus exceeded \$3,300,000, but in the first six months of the calendar year 1917 the road's net operating income showed a decline compared with the same months of last year of almost \$1,400,000.

The increasingly unsatisfactory financial results have been due partly to conditions special to the St. Paul, partly to conditions affecting all railways in its territory. The increase in the road's fixed charges, due to the construction of its Pacific coast extension, to its investment in electrification, to grade revisions, and so on, has been large, the annual interest on its funded debt having advanced from \$5,800,000 in 1909 to \$8,500,000 in 1912 and to \$15,600,000 in 1916. While there has been a large increase, meantime, in total earnings, the advances in operating expenses and taxes have been so large that net operating income has not increased enough to offset the increase in fixed charges. The ratio of operating expenses to earnings in 1909 was 65 per cent. In 1912 it had increased to 75 per cent. In 1916, with the large earnings of that year, it was 65.43 per cent.

These general developments have given rise to increasing criticism of the St. Paul's management under Mr. Earling. The road's results have been compared unfavorably with those of other roads in its general territory, especially those of the Burlington. For example, in 1902 the average revenue trainload of the Burlington was 200 tons, that of the St. Paul, 237 tons. In 1915, however, the figure for the Burlington was 492 tons; that for the St. Paul, only 390; in 1916, Burlington, 558 tons; St. Paul, 425 tons. Transportation expenses of the St. Paul for the year were 36 per cent of its total earnings; for the Burlington, only 29 per cent. The total operating ratio of the St. Paul was 65.43; of the Burlington, only 60. The Burlington spent \$1,283 per mile for maintenance of way; the St. Paul, only \$1,133; the latter being a figure considerably below the average for the large granger roads.

The showing of the road and the criticisms it evoked caused the development of a sentiment among some of the strong interests in it, notably that represented by J. Ogden

Armour, that the road was not being satisfactorily managed. There was some question as to whether all the large investment made by it in improvements in recent years had been well adapted to securing the best operating and financial results, and there was a feeling that Mr. Earling ought to retire from the active administration of the property and give place to a younger and more energetic man, preferably one experienced and skilled in the Hill methods of railroad operation. Mr. Earling himself accepted this view, the result being the selection of H. E. Byram to succeed him.

The retiring president transformed a granger road of 6,000 miles into a transcontinental system of 10,000 miles; it is the task of his successor to develop the great possibilities of that system.

Mr. Earling was born at Richfield, Wis., on January 19, 1848, and entered railway service with the Milwaukee & St. Paul, now the C. M. & St. P., in 1866. For six years he was a telegraph operator, following which he was a train despatcher for five years, and assistant superintendent four years. From 1882 to 1884 he was division superintendent, and from the latter date until 1888 assistant general superintendent. During the ensuing two years he served as general superintendent and in 1890 he was promoted to general manager. He held this position for nine years and in December, 1895, was also made second vice-president. From September 23, 1899, until the present time he has been president.

WAR RECORD OF C. P. R. MEN.—In spite of the fact that the trains of the Canadian Pacific Railway, have been occupied in the transportation of soldiers and war materials, and that the huge workshops of the company have been turning out vast supplies of munitions of war instead of engines and rolling stock, no fewer than 8,000 men in the service of the company have gone to the front. In every theatre of war they are to be found—in France, Italy, Russia, the Balkans, Mesopotamia, Africa. Of these 8,000 men (apart from 100 who are serving in the Navy) 1,309 have been killed or wounded, among the killed being Capt. the Hon. A. T. Shaughnessy, son of Lord Shaughnessy, president of the C. P. R. The C. P. R. and Dominion Express staffs in Great Britain before the war numbered 213, of whom 179 were of military age, and of those 179 no fewer than 158 have joined the colors.

MIXED GAGES AT THE FRONT.—An interesting despatch, recently sent from the western front by H. Warner Allen, a British war correspondent, throws additional light on the German system of strategic railways close to the firing line. The underlying idea was the elimination of great accumulations of material in the immediate neighborhood of the lines, where they are exposed to the risk of bombardment, and it has been found possible to work on this principle as the result of utilizing an enormous amount of prisoners, mostly Russian. An adequate labor supply is essential, because such a system requires a very considerable labor force for transshipping in case of a sudden demand for a change from a standard to the narrow gage lines. Material is first brought up on standard gage lines, then transshipped to meter gage lines, and finally run on to the 60-cm. tracks (1 ft. 11 $\frac{1}{2}$ in.) which feed the trenches. Huge junction stations have been laid out at centers where the different gages meet, and the finest of these is said to be at Ham, where there are two separate systems of standard and meter gage lines, capable of transshipping 3,000 tons a day. The Germans have made the greatest use of existing meter gage light railways, and to link these railway lines up with the standard gage main lines, mixed gage tracks have been provided. These are of two kinds; either a third rail has been laid on the standard gage lines or a meter track has been placed on the old roadbed.

System of Auditing on the Boston & Maine

Reports of Agents to the Freight Accounting Office Have Been Greatly Simplified. Daily Balances Obtained

AS the result of an investigation extending over a number of years, the Boston & Maine inaugurated, March 1, 1917, a simplified system of freight accounting on the daily report plan, which has resulted in a radical change in the methods heretofore in vogue on that road.

A review of freight accounting methods and a comparison of them with other accounting rules demonstrated that there was practically no relief to be obtained, either by the accounting department or at the station, from a revision of forms, it being shown very early in the investigation that freight accounting forms had been reduced to the lowest economical safety basis considering the purpose for which they were designed.

It was, therefore, decided to direct the entire energy of the investigation toward a satisfactory adaptation of current forms to a safe, economical plan of simplified accounting that

quirements of the station and the general office, were reduced to a carbon copy of the so-called cashiers' schedule.

Form of Agent's Schedule

This blank was made use of for the reason that it appeared necessary that this form should be made up currently

ABSTRACT OF INTERLINE WAY-BILLS RECEIVED																
FROM STATIONS ON THE				DIVISIONS		PROPORTIONS										
MONTH OF <u>July</u>	1917	N. Y. C. R. R.		<u>2826</u>	<u>59 47</u>											
VIA <u>Brook Jet</u>	AND			<u>7174</u>	<u>150 98</u>											
				<u>01</u>	<u>4 55</u>											
						<u>215 00</u>										
FROM <u>Amsterdam N.Y.</u>		TO <u>Portland</u>	STATE	STATE												
WAY BILLING NUMBER	ROUTE	MONTH	STATION	RECEIV- ING STATION	FORWARD- ING STATION	DATE	WAY-BILL NUMBER	COM- MODITY	KIND OF FREIGHT	WEIGHT		FREIGHT		ADVANCES		PREPAID
86	5 6 0	2		5 3 6	0 1 6 2	0 9	5 0 0	0 0 0		7 0 0		3 5 1				
86	5 6 0	2		5 3 6	0 1 6 2	0 9	4 9 9	0 0 0		2 8 2 0		1 3 4				
86	5 6 0	2		5 3 6	0 1 6 2	2 2	9 4 2	0 0 0		3 0 0		1 2 0				
86	5 6 0	2		5 3 6	0 1 6 2	2 2	9 4 5	0 0 0		1 5 0		1 6 0				
86	5 6 0	2		5 3 6	0 1 6 2	2 2	9 3 4	0 0 0		5 0 0		1 4 5				

Abstract of Interline Way Bills Received Printed by the Powers Tabulator from Cards Punched on Powers Machine

would avoid duplication of labor wherever possible. By a process of elimination, the reports to be made by the freight station to the accounting department, considering the re-

each day at the station in order to obtain an accurate record of the debits and credits to the station account.

It was found that all of the other forms in use could be

Coded Carbon of Way Bill Ready to Go to Card Punching Department

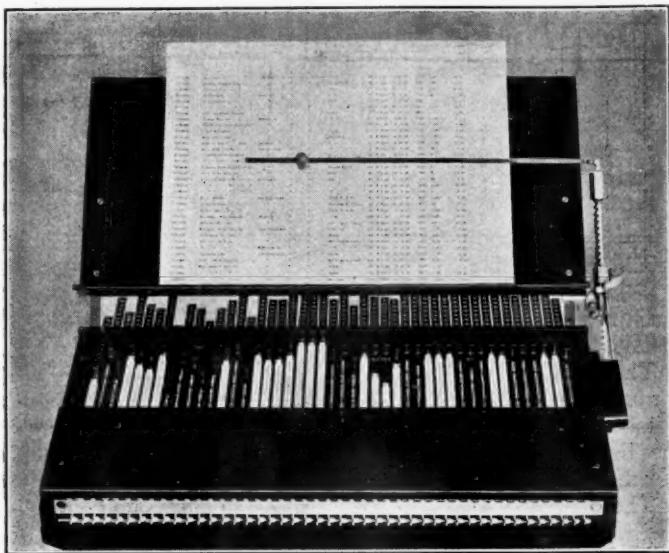
Forwarding Road		1 3 5 7 9 11 AUDIT MONTH 2 4 6 8 10 12		Forwarding Station		12	Day	1 3 5 7 9 CLASS RATES 2 4 6 8		Commodity		Weight (Lbs.)		Freight		Advances		Prepaid																								
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0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0																							
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Day	12	1 3 5 7 9 11 AUDIT MONTH 2 4 6 8 10 12	Forwarding Station	Miles	Commodity	Class Rates	Cars	Weight Cwt.	Freight	Advances	Prepaid	BOSTON AU																														
Day	11	2 4 6 8 10 12	Waybill No.	Receiving Sta.	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0																						
0 0 10	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0																							
1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1																							
Day	12	1 3 5 7 9 11 AUDIT MONTH 2 4 6 8 10 12	Fwd'g Station	Advances	Prepaid	BOSTON AU																																				
Day	11	2 4 6 8 10 12	Waybill No.	Rec'g Sta.	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0																						
0 0 10	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0																							
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Day	12	1 3 5 7 9 11 AUDIT MONTH 2 4 6 8 10 12	Receiving Station	Forwarding Station	Road	Route	A. F. R. or Voucher Number	Agents No.	Account	Debit or Credit	BOSTON AUDI																															
Day	11	2 4 6 8 10 12	Waybill No.	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0																						
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Day	12	1 3 5 7 9 11 AUDIT MONTH 2 4 6 8 10 12	Local Route	Cars	Class Rates	Commodity	Miles	Tons	Tons One Mile	E and M Revenue	BOSTON AUDI																															
Day	11	2 4 6 8 10 12	Sta. From or To	Road	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0																						
0 0 10	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0																							
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Day	12	1 3 5 7 9 11 AUDIT MONTH 2 4 6 8 10 12	Symbol	1 3 5 7 9 11 AUDIT MONTH 2 4 6 8 10 12	Route	Weight Tons		Freight		Advances	Prepaid	BOSTON AND MAINE RAILROAD AUDITOR OF FREIGHT ACCOUNTS (Form 796)																														
Day	11	2 4 6 8 10 12	Symbol	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0																						
0 0 10	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0																							
1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1																							
2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2																							
3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3																							
4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4																							
5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5																							
6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6																							
7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7																							
8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8																							
9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9																							
1 2 3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45

Powers Machine Cards Used on the Boston & Maine

From top to bottom: Interline received, Interline forwarded, Local received, Local forwarded, Miscellaneous and Corrections, Statistics, Recapitulation.

omitted and a good and sufficient reason assigned for such omission in each case, but no satisfactory substitute could be found for the cashiers' daily schedule.

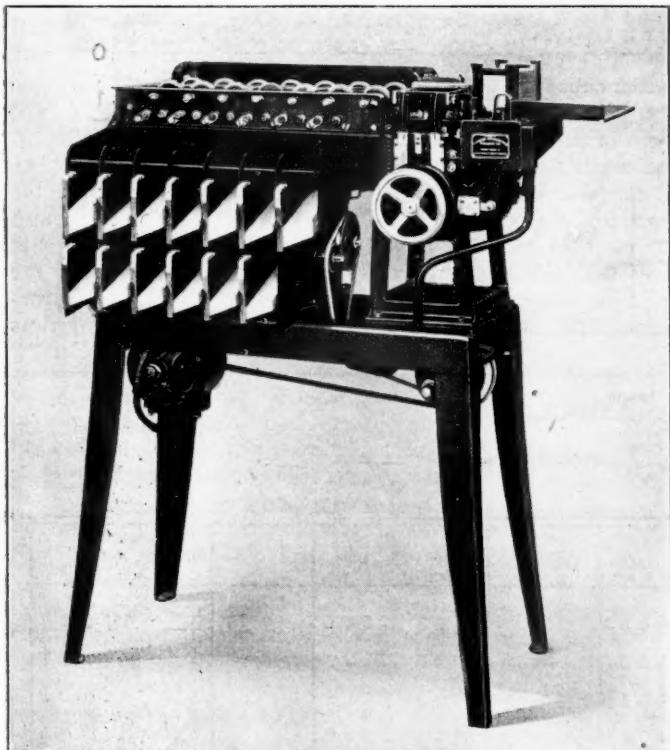
Having arrived at this point the effort was then made to change the cashiers' daily schedule sufficiently to make a



Key Board of Powers Card Punching Machine

carbon copy of it, satisfy the accounting department requirements, and at the same time not changing it in any way that would affect its efficiency, both in economy of time, labor and material, at the station.

During recent years it has become more and more appar-



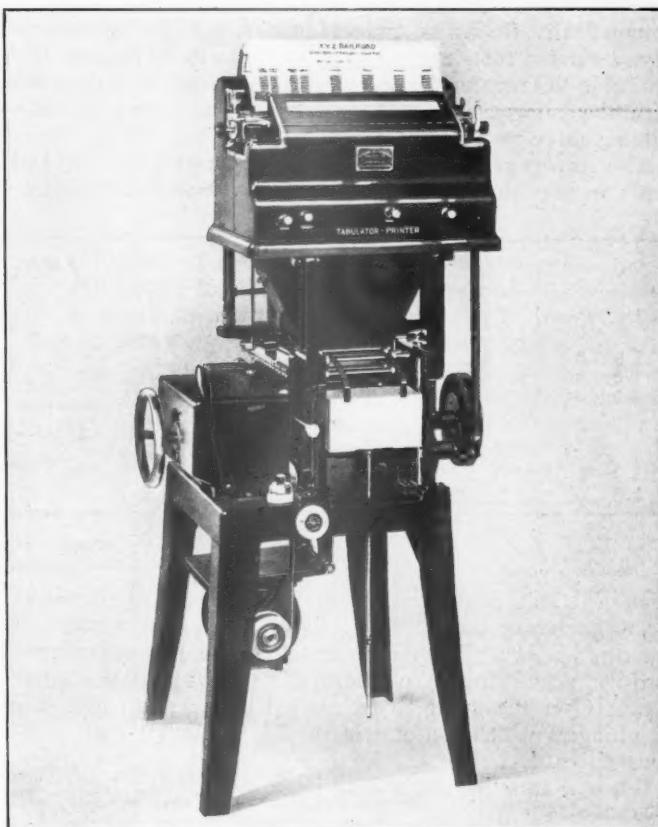
Powers Sorting Machine

ent that for statistical purposes the records of the accounting department must be used and, therefore, it has been increasingly evident that any statistics prepared at the station are a duplication, at least in part if not entirely, of records which are required for the same or other purposes in the accounting department.

With this in mind, it must be admitted that the station had very little interest in the tons, ton miles, commodity, or other statistical data. Therefore, if the station force is to accomplish the best results in the work properly assigned to it, relief must be given from reports of the above nature.

It is expected that the adoption of the daily report plan, detail of which follows, will accomplish that result and enable the station force to handle in a more satisfactory manner the duties required of it which, broadly speaking, are considered to be the solicitation, receipt and delivery of traffic, protection of the carriers' revenue and the proper consideration of the needs of the shipping public.

To accomplish the necessary results, machines such as manufactured by the Powers Accounting Machine Company, the Remington Typewriter Company and various calculating machine companies have been installed. The Powers system consists of three distinct types of machines, namely: The



Powers Tabulating Machine

punching or perforating machine; the sorting machine; and the tabulator-printer.

Tabulating cards $7\frac{3}{4}$ in. by $3\frac{1}{4}$ in. are used as a means of conveying information, such cards being specially designed to meet the requirements.

Waybills or copies of waybills are forwarded daily by the station freight agents to the office of auditor freight receipts. The data and information as shown on the waybills is perforated on the cards by the punching machine referred to. The perforated cards constitute the basis from which all subsequent operations are performed automatically on the sorting machines and tabulator-printers.

THE POWERS MACHINES

The blank, unpunched cards are placed in a magazine in the back of the machine and automatically fed after each punching by a raised edge about 0.005 in. high between the feeding rolls of the machine. The waybills or other data, from which it is desired to transfer the information thereon to the perforated cards, are placed on the rack above

and the operator sets the keys to the desired places indicating date, waybill number, station number, weight, freight charges, etc., presses a bar on side of machine, which trips the clutch, raises the dies and card holding mechanism against the punch and punches the entire number of holes desired at one stroke. After the die returns to the lower position the perforated card is automatically ejected into the front

moved forward in accordance with the position selected to its proper compartment. At the same time another card is fed from the magazine and the process repeated. The machine automatically stops when the last card has been selected and deposited in its proper compartment. Cards can be withdrawn from their respective compartments and additional cards placed in magazines without stopping the

Carbon Made by the Tabulating Machine

magazine, and at the same time another unpunched card automatically feeds into proper position for cutting and all keys return to their normal position so as to be immediately available to operator for the resetting of same to correspond with the information as shown on the following waybill. All naughts are punched automatically.

The sorting machine distributes or separates the punched cards in accordance with requirements as to sub-divisions.

machine. Cards can be assorted at the rate of approximately 300 cards per minute.

The tabulator-printer tabulates totals and prints them in conjunction with the designations of station or other group numbers directly upon a report or record; or, if desirable, the listing in detail of all items represented by the holes punched in each individual card.

The machine is easily operated, and the principle of

(Miscellaneous)				
(Day, Month)	(Station)	(Voucher Number)	(Account)	(Debit)
18 8	633	134577	6 1	100
18 8	633	134576	6 1	50
18 8	633	144974	5 1	200
				350
18 8	619	23152	5 1	200
18 8	619	23151	5 1	200
				200

Carbon of Miscellaneous

numerical sequence or classifications. Cards are placed in the magazine or hopper, being fed down by the pressure of the cards above. With each revolution of the machine a card is picked from the pile and passes under the guide plate. Over the guide plate, carried on a cross-frame, are 12 plungers which conform to the 12 horizontal digit positions on card.

When a card having a hole in any of the 12 horizontal

mechanical selection being practically the same as that of the sorting machine, excepting that it is provided with as many rows of pins as there are vertical columns upon the card to be selected. The card is divided into fields, and the rows of selecting pins are accordingly arranged so that they will select and effect the listing and addition of the columns comprising each separate adding field in the corresponding unit of the tabulator-printer. The selecting pins

730 REVISED		J. H. HUSTIS, TEMPORARY RECEIVER						ACCOUNTING CARD NO. 5		
BOSTON AND MAINE RAILROAD										
DEBIT CREDIT DAILY SCHEDULE OF CORRECTIONS										
AT	<i>Portland Me.</i>		STATION	<i>536</i>	FOR	<i>August</i>				1917
				NUMBER						
DAY MO.	W/B NO.	REC'D STA.	FOW'D STA.	ROAD	A.F.R. NO.		ROUTE	NO.	SYMBOL	DEBIT OR CREDIT
1	6 00028	536			219411		23	7660	3	1 2 6 1 7
25	5 00713	536			229158		23	7197	3	9 1
18	6 03034	536			214046		23	7218	3	1 6 0 0
22	8 00042	536			214049		23	7397	3	2 5

Daily Schedule of Corrections Made on the Tabulating Machine

lines in the row under the plungers passes under the guide plate, the corresponding plunger drops through the hole, setting the guide bar beneath, which diverts the card to the correct pocket. As soon as the tripping levers underneath have been set, the plungers rise out of the card and it is

act as human fingers and, according to the holes perforated in the various columns or fields of each card, make simultaneously the corresponding selection of all the items to be listed or added internally within the accumulative section of the machine. To operate the perforated cards are placed

in the magazine in practically the same manner as they are in the sorting machine. Each card is fed automatically into the proper selective position, and the mechanical selection accomplished, in accordance with the perforated information as indicated on card, as above outlined. Card is then automatically ejected into a receiving magazine, and the process repeated. A "total card" is placed between the cards for each station or sub-division, which actuates the total mechanism and automatically prints the totals accumulated to that point before proceeding with the tabulation of the subsequent group of cards in the magazine.

The machines are equipped with from five to seven adding units, each of which has a printing or accumulating capacity of nine figures; the selection, printing and adding upon all units being performed simultaneously.

Under the daily system plan, agents are required to render to the audit office daily schedules. These daily schedules comprise the following:

(1) Daily received schedule showing debit to the station. Both local and interline received waybills are reported on the same schedule under the proper caption.

(2) Advances forwarded schedule. All interline and local waybills carrying advance charges are reported on this schedule, amounts being separately listed as to local or interline in the proper column.

(3) Prepaid forwarded schedules whereon the agents list all the waybills carrying prepaid charges, separating the local from the interline in the proper columns in the same manner as outlined in connection with schedules one and two.

(4) Miscellaneous schedules whereon are reported all

HANDLING OF WAYBILLS

Original waybills, both interline and local, copies of waybills, both interline and local, are separated from the schedules either received collect, forwarded advances or forwarded prepaid, and are placed in the hands of a force of clerks for purposes of coding, which by the use of numerals expresses the station from and to billing or receiving road, route, commodity, etc.

This having been done the local received waybills and such foreign waybills as are designated to be handled by the Powers machines, together with the copies of forwarded local waybills bearing expense and prepaid charges, together with copies of all interline waybills are then passed to what is known as the key-punch section to have the information put on the cards as previously described.

Interline waybills from certain designated roads are passed to the Remington-Wahl (adding typewriter) operators who make individual abstracts covering each billing station, from and to, road and route, using what is known as a carbon cut-off which allows a proof sheet to be tabulated carrying all the information on one sheet that appears on the individual abstracts and allowing the operator when completing the abstracting of a station to accumulate immediately the total weight, freight, expense, prepaid and collect of each station.

LOCAL RECEIVED

A card form as shown is used for local received waybills. All of the information as shown is punched directly from the original waybills.

Stop or total cards are placed in the magazine of the

J. H. HUSTIS, Temporary Receiver									
SUMMARY OF AGENTS DR. AND CR. SCHEDULES ACCT. OF FREIGHT TRAFFIC									
BOSTON AND MAINE RAILROAD									
Brattleboro, Vt. (76)									STATION NAME
MONTH OF <i>May</i> 1917.									
CREDIT									
COLLECT RECEIVED	PREPAID FORWARDED	MISCELLANEOUS	DEBIT	VARIOUS	ADVANCES FORWARDED	PREPAID FORWARDED	CREDIT	VARIOUS	
LOCAL COLUMN 1	INTERLINE COLUMN 2	LOCAL COLUMN 1	INTERLINE COLUMN 2	COLLECTIONS COLUMN 1	CORRECTIONS COLUMN 1	LOCAL COLUMN 1	INTERLINE COLUMN 2	CORRECTIONS COLUMN 1	CREDITS COLUMN 1
1 77524	695 93	3 10	100			2 13		758	82
2 32751	249 72	604 15	45 94	41 24		600		525	
3 550 44	3 98 19	3 46 55	44 92	32 66				251	
4 289 74	254 80	456 42	72 55	35 42		2036	173		
5 65 26	152 60	166 35	51 37	32 60	29 14	600		533	1747 11 271

Sample of Monthly Summary of Agents' Debits and Credits

miscellaneous charges which are not strictly chargeable to freight revenue account.

(5) Correction schedule whereon are reported all undercharge and overcharge corrections affecting waybills previously reported.

Schedules are prepared in skeleton form, showing date, waybill number, freight bill number, and total of waybill either collect, advances or prepaid, as the case may be. In addition to the above reports agents are required to forward to the audit office at the close of each month a monthly summary of debits and credits.

The following is a brief outline of the methods in force after receipt of the above described schedules in the audit office.

Original waybills are attached to the received collect schedules and carbon copies of waybills are attached to the advances and prepaid forwarded schedules, no report being made for waybills bearing freight charges only. These are enclosed in special envelopes and received intact at the audit office where a proper check is made to insure the prompt receipt of reports from all stations, and are uniformly stamped with the date received. The distribution of the various schedules, waybills and copies of waybills is then made to the various sections assigned to the performance of the work.

punching machines by the punch operators after each set of cards are cut from the waybills included on a schedule for each station. These cards then move to the tabulating machine operators and are tabulated showing all necessary information, such as station number, waybill number, commodity number, as well as weight, freight, advances and prepaid charges; the tabulator automatically printing the totals as represented by each station schedule. The tabulated sheets then move to a set of clerks designated as examiners, whose duty it is to audit the daily schedules against the figures as shown on tabulated sheets, and the necessary corrections are then made.

The tabulated sheets having been balanced against agents' schedules, the perforated cards are filed in station order in filing cabinets and remain in that order until the close of the month.

INTERLINE RECEIVED

Interline received waybills are handled by both the Powers machine and the Remington-Wahl typewriters.

The card form being used for such interline waybills as are handled by Powers machines is shown, and such waybills are handled in identically the same manner as local received waybills.

Waybills handled by the Remington-Wahl typewriters,

the proof sheet, as previously referred to, is key-punched on what is known as a master card, showing the receiving station, weight, freight, expense and prepaid charges, which represent the total of a day's business, and this master card is combined with the tabulations of the Powers machine covering any one station for the day, and the combined figures are used to balance the interline column of the schedule.

LOCAL FORWARDED

Only such local forwarded waybills as bear expense or prepaid charges are coded and key-punched.

It is not considered necessary to balance out daily or for any period of time the local forwarded charges as against received local charges. This system, however, permits the actual balancing daily or for a period of time, of the forwarded local expenses and prepaids against received local expenses and prepaids.

Cards having been key-punched are handled in identically the same manner as local received.

INTERLINE FORWARDED

Copies of all interline waybills after being coded and key-punched are handled in identically the same manner as local received.

RESULT OF OPERATION

The perforated cards and the tabulations made therefrom now represent by days the total local received, weight, freight, expense and prepaid charges, the total interline received, weight, freight, expense and prepaid charges, the total local forwarded expense and prepaid charges, the total interline forwarded weight, freight, expense and prepaid charges and these cards filed in alphabetical order are held until the end of the month and the tabulations which represent the balance as between the machine operation and the agents' schedules are filed in station order and are held.

The various forms used to represent such miscellaneous charges as storage, switching, etc., are separated from the miscellaneous schedules and are handled in practically the same routine manner in the tabulating machine section.

At the close of audit month cards are sorted according to a miscellaneous charges classification and subsequent tabulations are made in conformity with established requirements.

CORRECTIONS

Under the new system instructions to agents provide that no corrections shall be included on daily schedules unless authorized by the audit office. The effect of this arrangement is to give the audit office complete control of the correction situation at all times. Waybills may be corrected before leaving the agent's office and reported on schedules on the basis of such corrected charges, attaching thereto copy of correction to sustain such corrected reporting; no subsequent reporting of corrections affecting waybills previously reported is permitted without the necessary authority from the audit office.

A card is cut for all corrections issued. These cards are listed in detail on the tabulator printers daily, and after proper checking of tabulated lists cards are assorts according to the station affected, they are also assorts as to undercharges and overcharges. A daily tabulation is then made on tabulator printers in duplicate. The original is sent to the agents together with a copy of correction with instructions to include total amount on his correction schedule of a certain date, duplicate statement being retained in the audit office to insure the agent's compliance with his instructions.

BALANCING

Recapitulation or master cards are cut daily for each station from printed tabulations of all detail cards, the

same card forms also being used for the punching of totals as shown on agent's schedules. A separate detail listing of these cards is made daily on the tabulator printer, the grand total of which must agree, thereby proving each day's work for the month.

Cards are separately filed in station order until the close of audit month and another listing is then made including the monthly balance which is also used as an audit of the agents' monthly summary of debits and credits.

This provides a very elastic method for balancing inasmuch as agents' accounts may be balanced by days, weeks, monthly, or for any period, and the agents' balance for any period of time must balance the combined local and interline account, both received and forwarded.

STATISTICS

All requirements as to daily and monthly statistics are for the most part obtained from the detail cards described.

The local received cards are taken from the file boxes, placed on the sorting machines, and are sorted in what is known as "station to station order," this giving a grand total as between each station on the line of the road, of the tonnage and freight charges, making it comparatively easy to insert the miles so as to arrive at the ton miles.

Interline received cards after being removed from the file cases are sorted in station order by junctions at which freight is received on the line of the road, in this way furnishing total tonnage and the freight charges via each junction to each station on the line of the road, and making it comparatively easy, after having inserted the miles, to arrive at the ton miles. The tons and ton miles of such abstracting as has been done by the Remington-Wahl typewriters is combined with this, and it has been found comparatively inexpensive to key punch cards from the Remington-Wahl tabulations covering this information as well as commodities and combine such tabulations with the Powers machines' tabulations.

Interline forwarded cards are sorted as from each Boston & Maine station in strictly numerical order of billing to all roads via any one junction, and after inserting the miles between that station and the junction it makes it comparatively simple to arrive at the ton miles.

Another sort of the cards is made through the sorting machines and cards are sorted out for each commodity by itself, and these cards put on the tabulator printer, a total weight of each commodity is arrived at, which combined, must agree with the total tonnage for the entire month.

The commodity tonnage, local received, interline received and interline forwarded can be kept entirely separate if necessary.

We are indebted to John F. Turner, general auditor, and to N. H. Ricker, auditor of freight receipts, for permission to study the Boston & Maine auditing system and to use the forms shown.

EXPORTS MAKE RECORD SINCE WAR WAS BEGUN.—Exports from the United States to the neutral world have doubled since the beginning of the European war, and to the belligerent world have trebled. A compilation made public recently by the National City Bank showed that exports to the neutral sections of the world other than those of Europe were, in the Government's fiscal year 1917, \$1,838,000,000 against \$877,000,000 in 1914. To neutral Europe the total for 1917 was \$414,000,000 against \$184,000,000 in 1914. This made the total exports to the entire neutral world, European and non-European, in 1917, \$2,252,000,000 compared with \$1,061,000,000 in 1914, and to belligerent Europe in 1917, \$4,042,000,000, against \$1,304,000,000 in 1914. The increase in exports to the entire neutral world 112 per cent, and to the belligerent countries of Europe 210 per cent.

Exclusive Federal Regulation Urged

U. S. Chamber of Commerce Committee Favors Federal Incorporation and Control of Securities and Rates

AS briefly noted in last week's issue, the United States Chamber of Commerce is taking a referendum vote of its membership on a report of its Railroad Committee recommending an extension of the authority of the federal government in matters of railroad regulation to avoid the present conflict between state and federal regulation. The referendum was ordered in accordance with a resolution adopted by the National Council of the chamber last November, recommending a referendum to ascertain the opinion of the business interests of the country respecting legislation designed to make certain that transportation facilities of the country may be stabilized, improved and extended to meet and keep pace with the needs of commerce and the entire public. The report of the committee is as follows:

PART I—RECOMMENDATIONS

The Railroad Committee has spent several months making a careful study of the present system of railroad regulation and reviewing the various plans for perfecting it that have been suggested by railroad executives, labor leaders, and commercial organizations in all parts of the country. The committee has also made a detailed analysis of all of the railroad bills introduced in the 63rd and 64th Congresses in order to learn what constructive plans have been proposed and what views have been expressed by the Congressional leaders on whom we must depend for any new railroad legislation. As a result of this study the committee has reached certain definite conclusions that are embodied in the four recommendations submitted in this report.

It has not been deemed necessary to include any recommendations having in view the provision of facilities for the transportation of men and materials during the present war, because the railway executives themselves are already doing very effective work along this line, thus giving positive assurance that in all cases of military necessity existing railroad facilities will be used to their maximum capacity.

The fact of overwhelming importance, however, is that as soon as the war is over the railroads will need greatly increased facilities in order to meet demands arising from the development of industries serving the home market, from the increasingly sharp commercial competition with foreign countries, and from the necessity for transporting to the seaboard enormous quantities of building materials, machinery, and other commodities needed for reconstruction in those parts of Europe that have been overrun during the war.

Undeveloped areas in our own country must be cultivated in order to supply the increasing demands for food at home and abroad. As transportation is an essential element in farm development, branch lines must be built and additional equipment provided to enable us to supply our own markets and those of our allies with the necessities of life.

The railroad question that is really of vital importance therefore is "What steps can we—the American people—take through our representatives in Congress to enable the railroads to secure the necessary capital for terminals, extensions, and equipment, and to provide such intelligent control and regulation as to insure efficient and uniform service?"

Unlike other business organizations the railroads are unable to control either their receipts or their expenditures.

Their receipts are limited by the Interstate Commerce Commission when it regulates the rates they are allowed to charge for transportation service which is the only thing they have to sell. At the same time their expenditures for labor and materials are increased by government authorities and labor organizations and by varying market conditions over which they have no control, and this is done without regard to whether the money needed to pay the increase arbitrarily imposed upon them is or is not available.

It is generally recognized that there are defects in the system of railroad regulation that have furthered the agitation in favor of government ownership. The committee believes, however, that it is entirely possible to perfect the present system of regulation under private ownership, and that if Congress will enact legislation based upon the recommendations made in this report it will go a long way toward accomplishing that purpose.

FEDERAL REGULATION OF RAILROAD SECURITIES

The issuance of railroad securities is now regulated by the states from which the railroads receive their charters. Since 1897 the legislatures of 23 states have enacted laws giving their regulatory commissions authority to regulate the issuance of railroad stocks and bonds; but these laws are so conflicting in character that they have had a disastrous effect on the financial condition of the railroads and have seriously interfered with necessary railroad development. Whatever the effect of the laws in these 23 states, there has been no attempt in the other states,—more than one-half,—to protect the public.

For reasons stated in Section I of Part II of this report the committee believes that the time has come for the federal government to assert its right to regulate security issues by placing them under the supervision of the Interstate Commerce Commission.

Therefore, the committee recommends that provision be made for federal regulation of the issuance of railroad securities.

RAILROAD INCORPORATION LAW

With few exceptions the railroads of the country are now operating under charters granted, not by the federal government, but by the individual states through which they run. For example, one trunk line running from Chicago to the Pacific Coast passes through seven different states and is obliged to operate under seven separate jurisdictions. The regulatory laws of each of these states define certain conditions that must be fulfilled by the carrier and impose certain obligations that may at any time be modified or extended by the state.

A study of the conflicting regulations adopted by the several states and of the confusion resulting from their enforcement has convinced the Railroad Committee that for reasons given in Section II of Part II of this report there is immediate need for the federal government to formulate a national transportation policy and to make possible the federal incorporation of interstate carriers.

The committee, therefore, recommends that Congress pass a general railroad incorporation law under which all railroad carriers subject to the jurisdiction of the Interstate Commerce Commission may organize.

FEDERAL INCORPORATION OF RAILROADS

There has been a great deal of discussion by shippers, carriers and government officials in regard to whether the

railroads should merely be given an opportunity to incorporate under federal authority or should be required to do so. Many constituent members of the Chamber of Commerce of the United States have made a careful study of this question and in resolutions forwarded to the chamber have declared themselves unmistakably in favor of compulsory federal incorporation. For reasons given in Section III of Part II of this report the Railroad Committee has reached a similar conclusion.

The committee, therefore, recommends that if Congress passes a railroad incorporation law, all railroad carriers subject to the jurisdiction of the Interstate Commerce Commission, both those now existing and those hereafter to be created, be required to organize under this law.

FEDERAL REGULATION OF RAILROAD RATES

The decisions of the United States Supreme Court in the Minnesota rate case, and in the Shreveport case, have established the authority of Congress to regulate intrastate rates whenever those rates throw an undue burden on interstate commerce. These cases recognize that when Congress passed the acts to regulate Commerce it did not exercise its full power of regulation; and that under these acts the Interstate Commerce Commission can regulate intrastate rates only to the extent of prohibiting discriminations found to exist between intrastate and interstate rates. For reasons given in Section IV of Part II of this report the committee believes that the control of the Interstate Commerce Commission should be extended and should be made complete over such intrastate rates when they affect interstate commerce.

Therefore, in view of the fact that conflict has arisen with respect to the jurisdiction of the Interstate Commerce Commission over intrastate rates, even though such rates affect interstate commerce, the committee recommends that the commission be given authority by statute to regulate intrastate rates when these rates affect interstate commerce.

PART II—SECTION I—FEDERAL REGULATION OF RAILROAD SECURITIES

Government regulation of railroad securities is necessary:

(a) *In the public interest.* Effective government regulation of railroad securities is necessary in the public interest. The fixed charges and other capital expenses of the carriers are in proportion to the volume of securities issued. The revenues to meet those expenses are necessarily derived from shippers and passengers. Those who make use of the railroads thus have a direct interest in the volume and character of the securities issued by carriers.

(b) *To protect investors.* As investors a large share of the public is affected by the amount and character of railroad securities issued. One railroad corporation has nearly 100,000 stockholders of whom about one-half are women; other corporations number their stockholders by the tens of thousands; while individual bond holders and persons who are indirectly such through insurance companies, trust companies and other fiduciary institutions holding these securities, total many millions.

(c) *To assure the provision of adequate transportation facilities.* The railroad companies also have need for government regulation of their securities. Without government regulation it is possible for a limited number of railway companies by speculative and irresponsible financing to bring all railroad securities under suspicion and thus to make it difficult for railroad companies generally to secure the funds needed to provide the public with adequate transportation facilities.

Federal regulation of railroad securities should be substituted for state regulation because:

(a) *Less than half of the states now regulate the issue*

of railroad securities. The present regulation is incomplete both because of the absence of regulation in a majority of the states and also because all of the important railroad systems in the United States have lines in several states. A large railroad company may have only a short mileage or even no mileage at all in the state from which the company's charter was derived. Under such conditions the corporation may escape regulation by the states that have the greatest interest in the financial operations and the service performances of the carriers. The railroad history of the last few years proves conclusively that state regulation does not prevent railway financing that is ruinous alike to the carriers and to the public.

(b) *The laws of the states vary greatly.* There are numerous instances of conflict between the laws of one state and those of another. This limits the effectiveness of the regulation of railroad securities while making the regulation unnecessarily expensive to the carriers. Government regulation of securities should be uniform throughout the country; it should be adequate for the accomplishment of the ends desired and should aim to be constructive and helpful to both the carriers and the public.

(c) *The federal government alone can make regulation uniform and effective.* The federal government acting through the Interstate Commerce Commission can make the regulation of railroad securities more effective than the several states can make it, however wisely they may act. The federal government can require regular and special reports of all railroad companies in the United States, it can obtain full information concerning the financial methods and operations of the carriers and concerning the capital needs of the corporation whose securities are subject to regulation. The federal government can also maintain adequate supervision over the financial operations of the carriers. It can enforce throughout the United States the requirements of the federal statutes and thus insure the observance by the carriers of the requirements contained in certificates authorizing the issuance and sale of securities.

Inasmuch as it is the United States government rather than the several states that can make uniform and adequate the regulation of railroad security issues and can maintain the supervision over the financial methods of the carriers that is needed to secure fully the aims of government regulation of railroad finances, legislation should be enacted substituting federal for state control and supervision of the financial operation of railroad companies.

Legislation for the federal regulation of railroad securities:

(a) Should define carefully the conditions to be complied with by the companies proposing to issue securities.

(b) Should give the Interstate Commerce Commission ample authority to obtain by investigation, and through regular and special reports of railroad companies, full information concerning the financial methods and operations of the carriers and the capital needs of the corporations whose securities are subject to regulation.

(c) Should enable the Interstate Commerce Commission to approve applications of carriers for authority to issue securities provided the Commission, after necessary investigation, finds that the petitioning carrier has fulfilled the requirements of the statute; and should also enable the Commission, if the provisions of the statute have not been fully observed, to require the carrier to make the necessary changes in its plans for the issuance of securities and to make appropriate amendments to its petition. The Commission should be authorized to approve a proposed issue of securities only when the financial plans and the petition of the carrier meet the requirements of the statute.

(d) Should require the Interstate Commerce Commission to maintain by means of an adequate force of inspectors such supervision over the financial operations of the

carriers as will enable the Commission to enforce the provisions of the statute and to insure the observance by the carriers of the requirements contained in the certificates authorizing the issuance and sale of the securities.

In November, 1916, the committee on capitalization and intercorporate relations of the National Association of Railway Commissioners reported as follows:

We reiterate the expression on this subject heretofore promulgated by your Association, and we unhesitatingly and emphatically declare our belief that the capitalization of the interstate carriers and the interstate public utilities should be subject to federal authority. To state the proposition is at once to answer it. It is not necessary to review the many cases so well known to the members of this Association, wherein several states have attempted to exercise jurisdiction over the identical issue of stocks and bonds by interstate carriers.

This report of the committee, to be sure, has not been formally approved by the association of railroad commissioners, having gone over for consideration until their next annual meeting. Nevertheless, the committee not only goes on record in favor of this proposition, but it calls attention to the fact that in 1913 the association approved the recommendation for the regulation of the stocks and bonds of interstate common carriers by the Interstate Commerce Commission; and that in 1915 a resolution in favor of vesting in the Interstate Commerce Commission control over the securities of railroads constructed across state lines was passed by the Association.

The report also calls attention to the fact that the Interstate Commerce Commission "have constantly urged with emphasis and detailed argument federal control of interstate capitalization." It is true that the report made some years ago by the commission of which President Hadley of Yale was chairman, did not favor vesting in the Interstate Commerce Commission control of the issuance of stocks and bonds by interstate carriers, but it is believed that subsequent developments (particularly the increased regulation of such stocks and bonds that has been vested by the legislatures of the different states in their state commissions) have altered the situation to such an extent that the conclusions of the Hadley commission are now inapplicable; and it is possible that if the question were again presented to that commission it would, in view of these subsequent developments, reach a conclusion in favor of federal control of such securities.

It is believed that the best results can be accomplished without disturbing the present outstanding obligations of the carriers. It seems quite possible under the decisions of the Supreme Court to reincorporate the existing corporations under a federal incorporation law without disturbing the outstanding securities. The reorganization would merely substitute a federal corporation in lieu of the existing state corporation. Such procedure would avoid serious legal questions as to the power of Congress to affect outstanding securities and the existing contracts. Under the decisions of the Supreme Court it is believed that the holders of the present securities would be held to have taken these securities subject to the paramount power of Congress over interstate commerce, and that therefore Congress could, in spite of these existing contracts, force the reincorporation of the railroads under a federal statute. But whether Congress could go further and provide, for instance, for the cutting down of outstanding securities to the present actual value of the properties they represent might be doubtful in law and would at any rate be questionable as a matter of practical procedure in view of the widespread opposition which would be felt to any move in that direction.

SECTION II—RAILROAD INCORPORATION LAW

Many of the leading commercial organizations in the country have declared in favor of federal incorporation of railroads. For example, the Philadelphia Board of Trade has submitted to the Chamber of Commerce of the United

States a program of remedial legislation in respect to government regulation of railroads which includes:

Legislation to provide for the grant of federal charters to all railroads engaged in interstate commerce without impairment on the one hand of the rights of the several states with regard to the fair proportionate taxation of railroad property within their borders and without surrender on the other hand of the rights granted to the roads by state charters except to the extent that such rights may be inconsistent with federal control; this legislation to be drafted with the end in view of placing all phases of railroad regulation in the exclusive control of the federal government.

The National Industrial Traffic League says in a report adopted November 10, 1916:

It appears to the majority of those present that federal incorporation of common carriers is desirable, provided that in bringing this about the government incur no moral and financial obligation in respect thereto.

The Railway Business Association says in a report on Congress and the railroads:

Incorporation and regulation of security issues should be federal.

The Illinois Manufacturers Association says in a report on railroad regulation:

The association approves the federal incorporation of common carriers and the federal regulation of the issue of securities of such carriers but only after providing proper safe-guards against increase and inflation of capitalization.

The Merchants Association of New York declared in a resolution passed in November, 1916:

That the public interest requires that all the railroads of the country shall be effectively regulated * * * by the sole authority of the federal government of the conditions under which railroad securities may be issued; and that as a means to that end federal incorporation of railroads should be provided for.

The Freight Traffic Committee of the Chicago Association of Commerce says in a report submitted in January, 1917, and afterwards adopted as the judgment of the Association of Commerce as a whole:

It seems to the Committee that the regulation of the issuance of securities and the expenditure of the money raised by the sale thereof should be placed by Congress in the exclusive control of the federal government; and that federal incorporation would be a proper means to the accomplishment of that end.

That Congress has power to enact a general railroad incorporation law must be conceded under the Pacific Railroad cases, 115 U. S. 1; The North River Bridge case, 153 U. S. 525, and the Metropolitan National Bank Case, 141 U. S. 520. The language of the recommendation is carefully selected to cover not only creation of railroad corporations but the nationalizing of corporations already existing under state charters. Indeed, the latter function is most important, since the need of new companies is not pressing.

The propriety of new legislation must rest on the existence of evils demanding remedy. The presence of evils in connection with the regulation of interstate commerce involved in railroad transportation is apparent to the most casual observer. A partial list of these evils includes conflict of jurisdiction between state and federal control resulting in confusion, inconsistency, useless expense, waste of energy and reduced efficiency of physical means at hand; apprehension of investors, frightened capital, and injured credit, resulting in reduced ability to augment physical equipment necessary to keep abreast of the expanding volume of business. From these basic evils there springs a host of lesser difficulties which will readily occur to the thoughtful mind.

In the process of delegating to the national government certain attributes of the sovereign states they divested themselves completely of certain powers, among which was the power to regulate interstate and foreign commerce. As to this power the relation of the two governmental jurisdictions was reversed, in that the states could exercise it only to the extent Congress chose to redelegate it, either directly or by implication from its own failure to exercise it. The present evils find their root in the failure, up to the present time, to crystallize this reversal of relation between the two governments into comprehensive legislation in respect

of interstate railroad transportation. The corporate creatures through which, almost exclusively, this transportation is conducted have with few exceptions derived their being from the states, and, in consequence, have owed allegiance to their creators in respect of all their activities except interstate commerce. The jurisdiction of the federal government is thereby limited to certain activities of these corporations while their general corporate existence is dominated by the states which created them.

This situation exactly reverses the relations between the two governments with respect to the greatest instrumentality of interstate commerce, *viz.*, railroad transportation. Instead of the national government creating the fundamental instrumentalities of interstate commerce over which it has exclusive control, and delegating authority over such of the local activities as could be best exercised by the states, the states have hitherto created them, notwithstanding exclusive authority over their interstate operations has been delegated to the general government through the commerce clause of the federal constitution. As a consequence, under modern conditions the great bulk (at least four-fifths) of their activities is dominated by a power different from that which imparted life to them and holds dominion over the conditions of their continued existence. Needing additional capital to supply increased facilities, they must obtain it under conditions imposed by a jurisdiction directly interested in only a small portion of the service to be improved thereby. While the local demand for equipment is but a small fraction of the whole, the rule of its distribution is made exclusively by the local authorities.

The foregoing recommendation seeks to correct the fundamental conditions producing these evils by transferring the allegiance of carriers engaged in interstate commerce to the jurisdiction of that realm in which the great and ever increasing proportion of their activities is carried on. That such a change of legal status would be beneficial seems obvious because (a) through this means adequate and consistent regulation of the issuance of securities necessary to provide the capital demanded for the increased efficiency of these carriers can be best provided; (b) in this way alone can the inevitable conflict between the fixation of intrastate rates by the local commissions and interstate rates by the Interstate Commerce Commission be peacefully and intelligently reconciled; (c) thus alone can the multiplicity of masters be practically eliminated.

The railway executives represented by Mr. Alfred P. Thom are on record before the Newlands Committee as favoring such regulation. It was urged by Mr. Thom that while, according to his view, it would be permissible for Congress to regulate the issuance of securities by interstate carriers even without federal incorporation, such a procedure would involve nice legal questions which might result disastrously to the railroads and the public, and that in order to avoid those difficulties he is emphatically in favor of federal incorporation of interstate carriers, there being under those circumstances no question as to the power of Congress to control the issuance of their securities.

The recommendation does not contemplate any interference with the power of the states to tax the physical property of the carriers at the same *ad valorem* rates as apply to all taxable property in the respective states. Neither does it contemplate that Congress would withdraw from the states power to make reasonable police regulations. While some of the powers of the various state railroad commissions would necessarily be transferred to the Interstate Commerce Commission, the state commissions would still retain responsibility for the regulation of thousands of local public utilities, and their real usefulness would be undiminished by the elimination of evils flowing at present from joint control of the operations and credit of interstate carriers by both state and federal governments.

Legislation involving the principles of this recommendation would lay the foundation of a new structure for the rehabilitation of railroad credit and thus relieve a situation that is characterized by impractical control, impaired usefulness, and inadequate regulation of railroad securities.

SECTION III—FEDERAL INCORPORATION OF RAILROADS

If it be desirable to authorize the incorporation and nationalization of all interstate carriers under general laws of Congress it would seem to follow as a necessary corollary that compliance with such laws should be made compulsory rather than permissive. This is true for the reason that one of the fundamental objects to be obtained is uniformity throughout the entire railroad system of the United States, and this cannot be obtained if any substantial lines are permitted to retain their allegiance to state authorities.

In order to make a railroad incorporation law effective it would be necessary to require all interstate carriers to organize under the law. It is quite probable that some of the important lines in the United States would not of their own volition change their allegiance from the state to the national authorities because of certain special privileges claimed under their state charters. It would be a matter for Congress to consider, if the law so recommended compels their nationalization, whether or not these special privileges would be in whole or in part continued. Whether this is done or not the paramount interests of the public which would be subserved by complete uniformity would outweigh any special privilege now enjoyed by any particular line under the provisions of its state charter.

SECTION IV—FEDERAL REGULATION OF RAILROAD RATES

Intrastate rates are closely interwoven with interstate rates and that any regulation of the one must have some effect upon the other seems clear. Most of the railroads of the country cross state lines and handle both intrastate and interstate commerce over the same rails, by the same employees, and often in the same cars. The same commodities are handled in both intrastate and interstate commerce. Mr. Justice Hughes in the Minnesota rate case said:

The interblending of operations in the conduct of interstate and local business by interstate carriers is strongly pressed upon our attention. It is urged that the same right of way, terminals, rails, bridges and stations are provided for both classes of traffic; that the proportion of each sort of business varies from year to year and indeed from day to day; that no division of the plant, no apportionment of it between interstate and local traffic can be made today which will hold tomorrow; that terminals, facilities, and connections in one state aid the carrier's entire business and are an element of value with respect to the whole property and the business in other states; that securities are issued against the entire line of the carrier and cannot be divided by states; that tariffs should be made with a view to all traffic of the road and should be fair as between through and short-haul business; and that, in substance, no regulation of rates can be just which does not take into consideration the whole field of the carriers' operations, irrespective of state lines.

It is to be observed that Mr. Justice Hughes does not in any way controvert the correctness of these contentions, but he goes on to say:

The force of these contentions is emphasized in these cases and in others of like nature by the extreme difficulty and intricacy of the calculations which must be made in the effort to establish a segregation of intrastate business for the purpose of determining the return to which the carrier is properly entitled therefrom * * *. But these considerations are for the practical judgment of Congress in determining the extent of the regulation necessary under existing conditions of transportation to conserve and promote the interests of interstate commerce. If the situation has become such by reason of the interblending of interstate and intrastate operations of interstate carriers and that adequate regulation of their interstate rates cannot be maintained without imposing requirements with respect to their intrastate rates which substantially affect the former, it is for Congress to determine within the limits of its constitutional authority over interstate commerce and its instruments, the measure of the regulation it should supply.

In both the Minnesota rate case and the Shreveport case the Supreme Court pointed out that Congress had not exercised the full jurisdiction vested in it by the Constitution over railroad rates, and that it was for Congress to determine how far federal regulation of any intrastate rates affecting interstate rates should go. The court did in the

Shreveport case, to be sure, hold that under the existing laws the Interstate Commerce Commission could by its orders indirectly affect intrastate rates when the Commission affirmatively found that actual discrimination resulted between existing intrastate and interstate rates. But under both of the above decisions the court emphasized the fact that Congress could lawfully exercise greater authority over intrastate rates than it had thus far vested in the Interstate Commerce Commission.

The committee believes that it is desirable that the regulation of all rates which affect interstate commerce, and so affect the people of more than one state, should be regulated by the Interstate Commerce Commission, the representative of the people of all the states. That only by vesting such power in the Interstate Commerce Commission can uniformity of regulation be brought about and all unfair discriminations abolished; that it is eminently unjust that intrastate rates should be regulated and controlled by state authority in such a manner as to give points within that state a preference over other competitive points situated in adjoining states; that this condition has already arisen on numerous occasions and is sure to arise again unless the Interstate Commerce Commission is given more complete jurisdiction over such discriminatory intrastate rates.

So long as there are two distinct regulatory bodies, the one the Interstate Commerce Commission and the other a state commission, exercising jurisdiction and control over rates for the transportation of the same commodities over the same rails and often in the same cars, the jurisdiction of the Interstate Commerce Commission depending on whether or not the transportation is interstate or affects interstate commerce, there is sure to be more or less conflict between these two regulatory bodies. The committee believes that such conflict should be reduced to a minimum and that it is to the interest both of the shippers and the carriers that in all matters affecting interstate commerce the supreme power of the federal authorities should be recognized and enforced. The committee therefore have made the above recommendation in favor of further legislation vesting in the Interstate Commerce Commission full jurisdiction over intrastate rates when they affect interstate commerce.

Undoubtedly a finding of fact by the Interstate Commerce Commission that a particular intrastate rate affects interstate commerce would be subject to review in the courts if the commission acted in a purely arbitrary manner and found that there was such a relation between the intrastate and interstate rates when there was no basis whatever for such conclusion; but if it was a matter upon which there could be an honest difference of opinion and there was some evidence in the record sustaining the conclusion of the commission, we believe that the finding of the commission in this as in other particulars would be treated as practically conclusive by the courts.

The members of the Railroad Committee are as follows: Harry A. Wheeler, chairman, banker, of Chicago; George W. Anderson, lawyer, of Boston, federal district attorney; F. C. Dillard, lawyer, of Sherman, Tex., formerly vice-president and general counsel of the Chicago, Rock Island & Pacific; R. H. Downman, of New Orleans, president of the National Lumber Manufacturers' Association; Dr. Thomas F. Gailor, chancellor and president of the board of trustees, University of the South; Stephen A. Foster, lawyer, of Chicago; Emory R. Johnson, professor of transportation and commerce, University of Pennsylvania; E. T. Meredith, editor and publisher of *Successful Farming*, Des Moines; George A. Post, president, Railway Business Association, New York City; William Z. Ripley, professor of political economy, Harvard University; G. W. Simmons, vice-president Simmons Hardware Company, St. Louis, Mo.; Alexander W. Smith, lawyer, of Atlanta, Ga.; and Charles R. Van Hise, president of the University of Wisconsin. Mr.

Anderson was unable to participate in the work of the committee and did not sign the report.

ARGUMENTS AGAINST THE COMMITTEE'S REPORT

To the report as submitted to the membership there is appended the following statement of arguments against the recommendations of the committee:

(a) The report recommends governmental control of securities, to be exercised by federal authority. Against these recommendations it may be argued that other methods for preventing abuses are possible and perhaps more desirable.

Legislation to prevent abuses in issue of securities can take the form of provision for greater responsibility on the part of the individual directors who participate, or who by virtue of their office should participate, in authorizing issues and on the part of the bankers who sell them to the public. Increase in responsibility in this way would not only prevent abuses but would in many cases lead to increased attention on the part of directors to the management of their corporations, which in the past has sometimes been left in large measure to an individual or a group of individuals, contrary to the principles which should govern use of the corporate form in business. In other words, it can be argued that legislation should take such form as to lead to increased efficiency in the direction of railways.

Governmental control of securities will have an opposite influence. The more authority the government—state or federal—exercises over such matters the less the responsibility to holders of securities that will lie with the men in charge of a corporation's affairs, and the less the incentive they will have to give the personal attention and effort that will make it a directly successful enterprise.

Moreover, a statute prescribing control of capitalization does not always afford protection against abuses; some of the state statutes regarding securities have not been vigorously enforced.

Government control, it may be argued, is also undesirable because it will directly or indirectly impose an obligation upon the government to adjust rates to the requirements for interest and dividends and in effect to guarantee that its regulation of rates will be of such a character as to insure returns upon the securities which are approved. Thus, a new element would be introduced into the question of rates, which is already very difficult. For the protection of the property actually invested this is not necessary, as regulation of rates cannot now be carried to a point where a fair return upon the property devoted to the public service is prevented. In order that the extent of this property may be determined Congress several years ago directed that it should be valued by the Interstate Commerce Commission, and much money and time have already been devoted to the task. If the element of providing for interest and dividends is introduced into consideration of rates, the present limitation upon the principle that a fair return upon property is to be allowed may be impaired; this limitation is that in any event the rates must be reasonable to the public.

In connection with the recommendation that regulation of securities should be undertaken by the federal government it may be argued that diversity in state legislation is not in itself an argument for federal action. This diversity exists with respect to legislation affecting many subjects other than railway securities. Regarding a number of subjects related to commerce—such as the law governing promissory notes, the law concerning the sale of personal property, and the law affecting warehouse receipts—uniformity has very largely been secured through the preparation of carefully drawn codes which could be authoritatively recommended to the states.

(b) The report indicates that approval should precede issue of securities. Against this recommendation it can be argued that such a procedure will not leave railways in a

position to take advantage of favorable situations in the market for money.

Changes in the money market are often rather sudden. If a corporation seeking new funds is to obtain them at low cost, it must act quickly in making its arrangements and take advantage of favorable opportunities. It cannot act quickly, however, if the securities to be sold have to receive approval in advance, since such approval can be given only after thorough investigation. Such an investigation by a government authority will require delay. The result may be that the cost of funds will be materially increased.

(c) Against the recommendation of the report that outstanding securities should remain as they are it might be urged that such a plan might contain an element of unfairness to the public.

Outstanding bonds will run for varying periods; some will not mature until the last decade of this century, and a few run to dates subsequent to the year 2000. These distant maturities indicate the dates to which any complete readjustment of securities to property values might be delayed.

Whatever the maturity, provision would eventually have to be made to retire these bonds. In order to make provision for retirement, and for interest in the interval, there would be, under a plan of governmental regulation of new issues, a degree of pressure upon the regulating authority to cause rates charged for service to yield the necessary funds. So far as this influence was operative, and caused rates which by present standards would be unreasonable to the public, the result would be detrimental. Receiverships growing out of past errors in management might be avoided, but at the cost of the public.

Likewise, if outstanding stock should remain in all cases, similar inequity might result, since the plan might fairly be said to tend to cause enhancement of such stocks. Stock by its nature has no date of maturity, except insofar as the life of the corporation is limited by statute, and outstanding stocks might consequently become a part of the capital upon which the regulating authority would have to seek to cause a return.

Under these circumstances, there might be a question which would be the more equitable and desirable course—an attempt to arrange for conversion of existing stocks and bonds into new securities issued upon a basis of present actual property values or a decision, because of the difficulties in the way of such a conversion, to continue the present capitalization of all railways under conditions which may cause rates to bear special charges in cases of erroneous capitalization.

(d) With respect to the recommendation of the report that there should be a general federal statute under which railways may incorporate it may be argued that, on the contrary, railways should continue as state corporations.

The proposal of the report would place railways in a situation different from the position of other corporations that engage in interstate commerce and different from the status of individuals. Except in so far as Congress might otherwise direct, they would not be subject to suit in state courts nor would they be subject to the taxing power of the states. In other words, they would largely cease to have dual relations, to state and federal authority, and become subject only to federal authority.

Such a result would in many ways be a reversal of the present situation. An individual is subject to the laws of the state in matters as to which states have jurisdiction under the Constitution, and to the laws of the United States as to subjects regarding which the Constitution confers power on the federal government. At present a corporation organized under the laws of a state is likewise under dual control, but the fact that it is organized under state law does not impair the extent in which it is subject to federal laws in those regards which under the Constitution belong to the United

States. In other words, it can be argued that a state railway corporation is subject to complete federal regulation with respect to its participation in interstate commerce, and that the degree of this possible regulation cannot be increased by federal incorporation.

Federal incorporation might, on the other hand, lead to impairment of the exercise of rights which belong to the states. Even though Congress made federal corporations subject to suit in state courts, and to local taxation as to tangible property, one Congress cannot bind another and, consequently, a succeeding Congress might alter the policy. In any event, state taxes on intangible property values which have been laid in many states, whether rightly or wrongly, might be made impossible.

The argument of the report that a railway line which operates in two or more states should be incorporated under federal law, and at least in some ways withdrawn from local control, may not recognize the differences in conditions, and the differences in local public opinion regarding policies, that are inevitable in so large a country as the United States. These differences are recognized in the combination of state and federal government which we have. It may be consistent with the fundamental principles which have generally left local questions to state authority that a railway operating in Oregon and Idaho should be subject to different taxes, and to different regulations as to protection of the public from physical injury, from the taxes and the regulations which are made applicable to a railway operating in Pennsylvania and Ohio, or in Georgia and Alabama. A circumstance that the roads might happen to belong to the same owner should have no bearing.

(e) Compulsory incorporation under a federal law, which is recommended by the report, might retard new construction.

Most of the railway systems of the country originated as small lines, undertaken in the first instance by local promoters, and to a degree new construction is still a matter of local initiative. When a small line is contemplated by local interests, the organizers of the enterprise may prefer to incorporate under state law; according to the recommendation of the report, however, they would have to obtain a federal charter as soon as their line began operation, since it would almost inevitably carry interstate shipments. Even if new construction tends to be undertaken more and more exclusively by railway systems, rather than by local enterprise, it may be unwise to take any action that will discourage the latter.

As to existing roads compulsory incorporation also raises legal questions. Since the present state corporations have special privilege in some instances, it is possible that they cannot be deprived of these privileges as a matter of regulation, unless the privileges are abuses which Congress can prohibit under its regulatory power. Stockholders and bondholders of state corporations might be upheld by the courts if they refused to exchange the obligations they held for obligations of new corporations.

Compulsory federal incorporation has not been used in other fields. For example, the national banking law did not compel state banks to convert into national banks.

WOOD FOR FUEL IN ARGENTINA.—The use of wood fuel to replace coal is assuming important proportions and is contributing a good share to the railway traffic of the Province of Santa Fe. It is reported that one railway transported 150,000 tons of wood in June, and that larger shipments are in prospect, insomuch that the Santa Fe Railway has been compelled to warn shippers not to contract for larger quantities than the facilities of the railway can accommodate. It is reported from the Province of Santiago del Estero that many thousand tons of hardwood fuel are awaiting cars for transportation southward.

W. W. ATTERBURY APPOINTED DIRECTOR GENERAL OF TRANSPORTATION

Official announcement has been made that W. W. Atterbury, who was recently given a leave of absence as vice-president of the Pennsylvania Railroad, has been appointed director general of transportation of the United States expeditionary force now in France, a position corresponding to that of S. M. Felton as director general of railways in this country. The two officers will co-operate in securing railway and transportation equipment of all kinds and also the special units of railway men necessary for the transportation work in France. Mr. Atterbury is now in France in active charge of broad and narrow gage railways, docks and highways, in the immediate zone of operations.

Mr. Atterbury was born on January 31, 1866, at New Albany, Ind., and graduated from Yale University. He entered railway service in 1886 as an apprentice in the Altoona shops of the Pennsylvania Railroad. From 1889 to 1892 he was assistant road foreman of engines on various divisions and the Philadelphia, Wilmington & Baltimore; from 1892 to 1893 he was assistant engineer of motive power on the northwest system of the Pennsylvania Lines, and from 1893 to 1896 master mechanic at Fort Wayne, Ind. On October 26, 1896, he was appointed superintendent of motive power of the Pennsylvania Railroad at Altoona, and from 1901 to 1903 was general superintendent of motive power with the lines east of Pittsburgh and Erie. On January 1, 1903, Mr. Atterbury was appointed general manager, which position he held until March 24, 1909, when he was elected fifth vice-president.

He was later made fourth vice-president and on May 8, 1912, vice-president in charge of operation. Mr. Atterbury is president of the American Railway Association.

STOKER OPERATION ON THE BALTIMORE & OHIO*

By W. L. Robinson

Supervisor Fuel Consumption, Baltimore & Ohio

Locomotive stokers made their appearance on the Baltimore & Ohio in the latter half of 1912 and have been gradually added until there are now 373 locomotives stoker-fired. The installations under way will bring the total number of stoker locomotives up to 429. By the use of these stokers the manual labor of firemen in placing coal in the firebox has been very greatly reduced. They have eliminated the discussion as to the necessity of two firemen on locomotives, and it has not been necessary to have the coal shoveled forward on the engine tender at intermediate points. The

stoker has made it possible to increase the load hauled by a locomotive from 8 to 15 per cent. The principal advantage derived from the use of the locomotive stoker is that it has made it possible to use the full boiler capacity over extended periods and at points where the maximum tractive effort of the locomotive is required.

On the Baltimore & Ohio the stoker engines handle 58 per cent of the freight gross ton mileage of the system and consume 58.2 per cent of the total freight fuel, or 31 per cent of the total locomotive fuel. The installation of crushing plants at some fuel stations has been provided for, and these plants will be used for properly preparing the coal for these engines, thus permitting more economical use of the fuel.

Road tests have shown that the mechanical firing of the smaller sizes of coal is not as economical as manual firing of run-of-mine coal. This has been confirmed by recent laboratory tests at the University of Illinois, these tests showing

that the mechanical firing of 1 1/4-in. screenings is 15 to 18 per cent less efficient than when firing run-of-mine coal by hand, and that when 2-in. screenings are used on a stoker engine, there is a loss in efficiency of from 7 to 13 per cent as compared to hand firing with run-of-mine coal.

When hand firing run-of-mine coal at a rate of combustion slightly below the average (50 lb. per square foot of grate surface per hour) it has been found that the loss due to stack cinders was 3 1/2 per cent, whereas with the 1 1/4-in. screenings from the same mine, used on a stoker-fired engine, the loss was 12 per cent. At the rate of combustion at which locomotives are operated a considerable portion of the time (110 lb. of coal per square foot of grate surface per hour) the losses were 9 and 16.1 per cent respectively.

To obtain maximum economy with stoker-fired engines, it is essential that

the coal be high in volatile matter, that it be as large as can be handled by the stoker (2 1/2-in. screenings), that the exhaust nozzle be as large as the conditions will permit, that the brick arch be maintained in accordance with existing standards, and that the distributors and stoker apparatus be maintained and handled in accordance with instructions. If these items are followed carefully, the spark loss will be reduced materially and the capacity of the locomotive will be increased.

During the past fiscal year the fuel consumed on the Baltimore & Ohio was under 6,000,000 tons. Comparing the fiscal year of 1916 with the year before, systematic efforts were made to conserve fuel, there was 0.1 per cent less fuel used, 33.3 per cent more net tons hauled one mile, and 26.7 per cent greater revenue. For the first nine months of the 1916-17 fiscal year only 3.48 per cent more fuel was used, as compared with a similar period for the previous fiscal year, with an increase of 36.6 per cent in net tons hauled one mile and with an increase of 35 per cent in revenue.

*Presented at the Deer Park meeting of the Baltimore & Ohio officers.

INCREASE IN OPERATING EFFICIENCY IN JUNE

With an increase of only 10 per cent in train miles, the railroads of the United States in the month of June handled 23.2 per cent more revenue ton miles of freight than in June, 1916, according to the monthly report of freight operations compiled by the Bureau of Railway Economics for the Railroads' War Board. The returns included in the statement represent about 85 per cent of the total operated mileage of roads of Class 1 and about 88 per cent of their total traffic.

The revenue ton miles for the month amounted to 32,504,988,201, as compared with 26,379,460,986 in June, 1916. Freight locomotive miles increased 10.5 per cent, loaded freight car miles increased 10.7 per cent, while empty freight car miles increased only 8.7 per cent. This increased service was performed with an increase of only 1.8 per cent in the

in the efficiency of freight operation, which has also been shown in the reports for the months of May and April, are given in the table.

RAILWAYS IN CHINA.—An order has recently been placed with American mills, says The London and China Telegraph, for rails and fittings for the 20-mile extension of the Sunning Railway, which has been in contemplation for some time. The Sunning Railway is that constructed by Chinese-American capital, under the presidency and control of Mr. Chin Gee Hee. The company has constructed about 80 miles of road connecting Kongmun, a city on tidewater, with Sunning city, and on to the vicinity of Canton. The extension of 20 miles planned is to the west of Sunning city to Pak Sha, and eventually is to extend south to the seaboard at Yeung Kong. It is further planned to extend the road westward

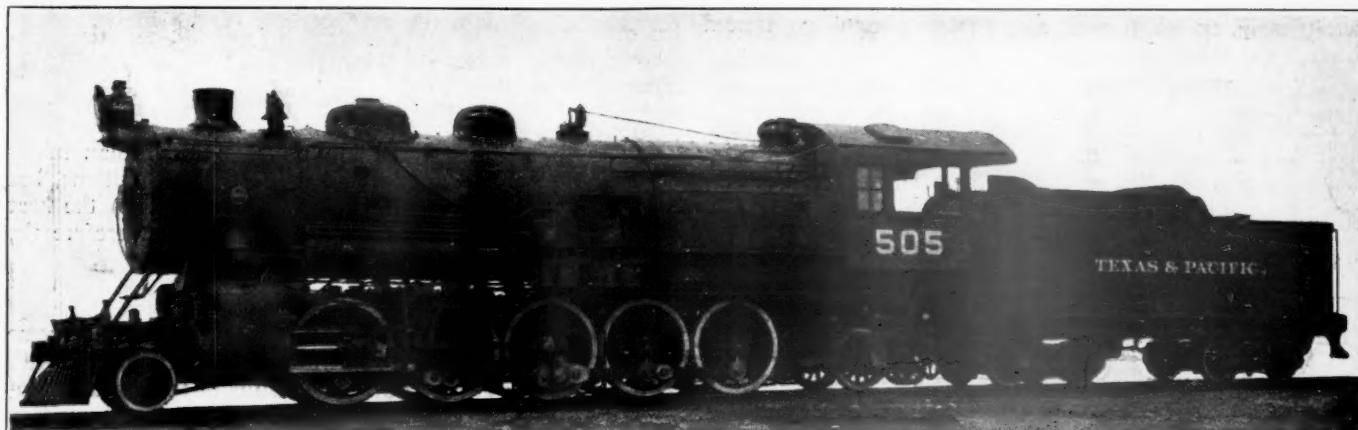
MONTHLY REPORT OF FREIGHT OPERATION OF STEAM RAILWAYS IN THE UNITED STATES FOR THE MONTH OF JUNE, 1917.
COMPARED WITH JUNE, 1916

Item	UNITED STATES		Increase or decrease		EASTERN DISTRICT		Increase or decrease	
	1917	1916	Amount	Per cent	1917	1916	Amount	Per cent
Freight train-miles	49,337,461	44,859,379	4,478,082	10.0	21,513,679	20,411,265	1,102,414	5.4
Loaded freight car-miles	1,264,231,358	1,141,698,059	122,533,299	10.7	587,100,279	550,875,683	36,224,596	6.6
Empty freight car-miles	577,333,929	530,997,132	46,336,797	8.7	279,560,435	274,428,592	5,131,843	1.9
Total freight car-miles—loaded and empty	1,841,565,287	1,672,695,191	168,870,096	10.1	866,660,714	825,304,275	41,356,439	5.0
Freight locomotive-miles	58,262,226	52,721,249	5,540,977	10.5	28,703,624	27,011,894	1,691,730	6.3
Revenue ton-miles	32,504,988,201	26,379,460,986	6,125,527,215	23.2	16,671,139,151	13,973,626,824	2,697,512,327	19.3
Non-revenue ton-miles	2,777,074,754	2,407,554,557	369,520,197	15.3	853,918,604	784,682,411	69,236,193	8.8
Average number of freight locomotives in service	27,488	26,997	491	1.8	12,568	12,378	190	1.5
Average number of freight locomotives in shop or awaiting shop	3,785	4,215	d 430	d 10.2	1,779	1,919	d 140	d 7.3
Average number of freight cars in service	2,107,867	2,043,365	64,502	3.2	1,165,589	1,133,483	32,106	2.8
Average number of freight cars in shop or awaiting shop	121,521	130,440	d 8,919	d 6.8	70,061	73,312	d 3,251	d 4.4
Home	92,097	105,562	d 13,465	d 12.8	52,429	57,914	d 5,485	d 9.5
Foreign	28,534	24,139	4,395	18.2	17,632	15,398	2,234	14.5
Tons per train	715	642	73	11.4	815	723	92	12.7
Tons per loaded car	27.9	25.2	2.7	10.7	29.9	26.8	3.1	11.6
Average miles per locomotive per day	70.7	65.1	5.6	8.6	76.1	72.7	3.4	4.7
Average miles per car per day	29.1	27.3	1.8	6.6	24.8	24.3	0.5	2.1
Per cent of empty car-miles	31.4	31.7	d 0.3	d 1.0	32.3	33.3	d 1.0	d 3.0
Per cent of freight locomotives in shop or awaiting shop	13.8	15.6	d 1.8	d 11.5	14.2	15.5	d 1.3	d 8.4
Per cent of freight cars in shop or awaiting shop	5.8	6.4	d 0.6	d 9.4	6.0	6.5	d 0.5	d 7.7
Average miles operated—single track	196,131.33	195,998.18	133.15	0.1	52,811.50	52,881.76	d 70.26	d 0.1
SOUTHERN DISTRICT			Increase or decrease		WESTERN DISTRICT		Increase or decrease	
Item	1917	1916	Amount	Per cent	1917	1916	Amount	Per cent
Freight train-miles	7,763,686	7,106,767	656,919	9.2	20,060,096	17,341,347	2,718,749	15.7
Loaded freight car-miles	190,706,511	176,846,422	13,860,089	7.8	486,424,568	413,975,954	72,448,614	17.5
Empty freight car-miles	92,766,044	83,051,613	9,714,431	11.7	205,007,450	173,516,927	31,490,523	18.1
Total freight car-miles—loaded and empty	283,472,555	259,898,035	23,574,520	9.1	691,432,018	587,492,881	103,939,137	17.7
Freight locomotive-miles	8,532,188	7,739,571	792,617	10.2	21,026,414	17,969,784	3,056,630	17.0
Revenue ton-miles	4,958,903,529	4,216,764,152	742,139,377	17.6	10,874,945,521	8,189,070,010	2,685,875,511	32.8
Non-revenue ton-miles	469,262,667	403,613,198	65,649,469	16.3	1,453,893,483	1,219,258,948	234,634,535	19.2
Average number of freight locomotives in service	4,546	4,468	78	1.7	10,374	10,151	223	2.2
Average number of freight locomotives in shop or awaiting shop	532	560	d 28	d 5.0	1,474	1,736	d 262	d 15.1
Average number of freight cars in service	260,900	260,776	124	0.1	681,378	649,106	32,272	5.0
Average number of freight cars in shop or awaiting shop	14,535	16,801	d 2,266	d 13.5	36,925	40,327	d 3,402	d 8.4
Home	11,205	14,289	d 3,084	d 21.6	28,463	33,359	d 4,896	d 14.7
Foreign	3,330	2,512	818	32.6	7,572	6,229	1,343	21.6
Tons per train	699	650	49	7.5	615	543	72	13.3
Tons per loaded car	28.4	26.1	2.3	8.8	25.3	22.7	2.6	11.5
Average miles per locomotive per day	62.6	57.7	4.9	8.5	67.6	59.0	8.6	14.6
Average miles per car per day	36.2	33.2	3.0	9.0	33.8	30.2	3.6	11.9
Per cent of empty car-miles	32.7	32.0	0.7	2.2	29.6	29.5	0.1	0.3
Per cent of freight locomotives in shop or awaiting shop	11.7	12.5	d 0.8	d 6.4	14.2	17.1	d 2.9	d 17.0
Per cent of freight cars in shop or awaiting shop	5.6	6.4	d 0.8	d 12.5	5.4	6.2	d 0.8	d 12.9
Average miles operated—single track	32,655.04	32,625.58	29.46	0.1	110,664.79	110,490.84	173.95	0.2

d Decrease.

average number of freight locomotives in service and of 3.2 per cent in the number of freight cars in service. The number of tons per train was increased from 642 to 715, 73 more tons, or 11.4 per cent, while the tonnage per loaded car was increased by 2.7, or 10.7 per cent. The average miles per locomotive per day increased 5.6, and the average mileage per car per day increased 1.8. The percentage of empty car miles was reduced by 1 per cent. The percentage of freight locomotives and freight cars in shop or awaiting shop was also reduced. The details showing this remarkable increase

from Yeung Kong into Kwangsi Province, with the idea of tapping the Pak Hoi district and connecting that part of the province with Hong-Kong. For the present, however, construction is to be undertaken only to the sea. The railway is a good example of what may be accomplished by intelligent railway work in China. The concern was started with comparatively small capital, and most of its line and equipment have been paid for out of the earnings of the parts of the line already in service. This has been the case with the new extension.



Type of Locomotive on Which Firebox Temperature Tests Were Made

Oil Burning Locomotive Firebox Temperatures

Firebox Temperatures and Boiler Efficiency Increased,
and Smoke Reduced by the Use of the Gaines Wall

TO determine the effect on the temperature in the firebox of oil-burning 2-10-2 type locomotives which were equipped with the Gaines wall, the Texas & Pacific conducted a series of tests from which important data has been obtained. These locomotives are equipped with a Jacobs-Shupert firebox 176½ in. long and a combustion chamber of 42½ in. long. Between the two is located the Gaines wall with five 3-in. air ducts. The principal dimensions of the locomotive on which these tests were made are as follows:

Service	Freight
Fuel	Oil
Tractive effort	62,700 lb.
Weight in working order	324,600 lb.
Weight on drivers	262,100 lb.
Weight of engines and tender in working order	501,300 lb.
Cylinders, diameter and stroke	.28 in. by 32 in.
Driving wheels, diameter over tires	.63 in.
Working pressure	185 lb. per sq. in.
Boiler, outside diameter of first ring	.84 in.
Firebox, length and width	176½ in. by .82 in.
Firebox, type	Jacobs-Shupert
Tubes, number and outside diameter	.267—2 in.
Flues, number and outside diameter	.41—5½ in.
Tubes and flues, length	18 ft.
Heating surface, tubes and flues	3,539 sq. ft.
Heating surface, firebox	307 sq. ft.
Heating surface, total	3,846 sq. ft.
Superheater heating surface	886 sq. ft.
Grate area	70 sq. ft.

Contrary to previous practice, temperature readings were obtained at four points in the firebox by means of a platinum rhodium thermocouple in connection with a Leeds & Northrup potentometer indicator, furnished by the railway department of the University of Illinois, and the readings were taken by Professor J. M. Snodgrass. Eight tests were made, four with the Gaines wall in place and four with the wall removed. The thermocouple locations are shown in Fig. 1. Locations A, B, C and D show points at which temperature determinations were made with the wall in place, while A', B', C' and D' show locations of thermocouple with the wall removed. The thermocouples were introduced into the firebox through holes in the combustion chamber floor and firepan, the body of the thermocouple being protected from the flame by a water jacket.

As the type of instrument used in these tests was not of a sufficiently rugged character to withstand the jars and shocks incident to a road test, standing tests were conducted by removing the main valves and blowing all the steam generated through the valve chamber and out of the stack. In order to make the tests strictly comparable, an endeavor was made

to keep the oil fired during each test the same, by working the firing valve and the throttle in a constant position. As the results show, however, this did not accomplish the desired effect, as a little more oil was burned without the wall than

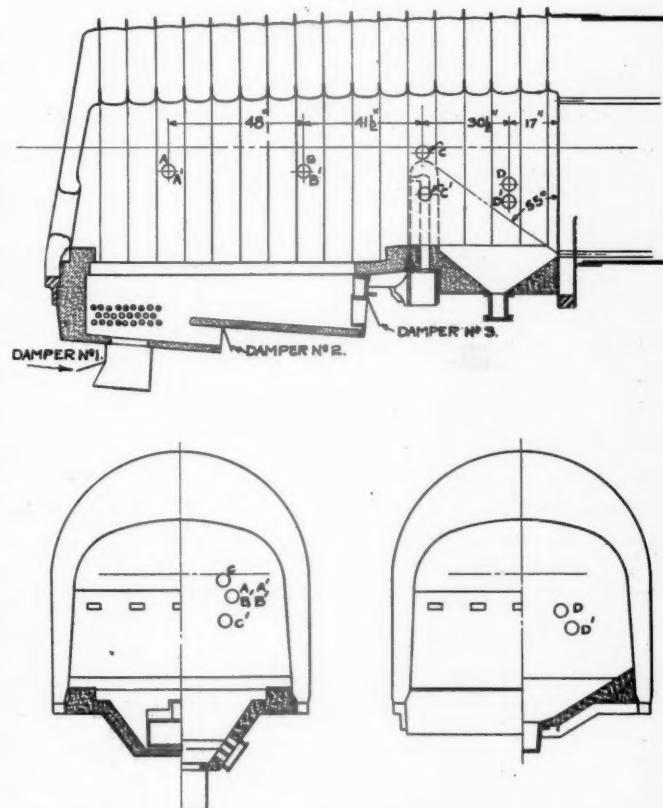


Fig. 1—Arrangement of Firebox Showing the Thermocouple Locations

with it. A Louisiana fuel oil with a gravity of 24 to 30 and heat value of 19,332 B. t. u. per pound was used. In order to compare the results obtained from the standing test with road service conditions two road tests were made, tem-

peratures being taken with a radiation pyrometer inserted through the door.

FIREBOX TEMPERATURE RESULTS

The firebox temperatures obtained during both the standing tests and the road tests are shown in Table I. Fig. 2 shows graphically the maximum temperature ranges, with

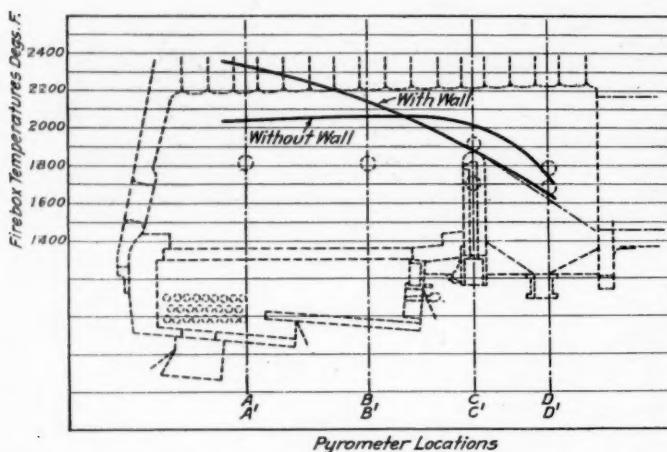


Fig. 2—Range of Temperatures in the Firebox of the Texas & Pacific Oil-Burning Locomotive

and without the Gaines wall, the average temperatures being 20 to 60 deg. lower than those indicated by the curves. It will be observed that with the wall in place, the highest temperatures were obtained in the back part of the firebox; and

TABLE I—AVERAGE TEMPERATURE AND DRAFT.
STANDING TEST—ENGINE 511

Test No.	I. & N. Pyrometer	Firebox Temperature F°		Radiation Pyrometer	Front End	Draft		Oil Burned
		Avg.	Max.		Through Door	Ins. of Water	Front	
3	A	2,315	2,330	....	595	3.8	8.4	3,952
7	A'	2,000	2,040	2,000	645	4.1	8.9	4,164
2	B	2,050	2,140	2,045	....	3.0	7.8	4,004
6	B'	1,940	2,055	2,040	615	3.8	8.5	4,008
1	C	1,855	1,875	2,315	....	2.9	8.0	3,139
8	C'	1,960	2,020	2,015	625	3.9	8.3	4,261
4	D	1,580	1,645	2,025	590	3.8	8.5	3,607
5	D'	1,710	1,730	2,030	580	3.7	8.0	4,135
ROAD TEST—ENGINES 500 AND 511								
Engine 511, with Gaines Wall...		2,110	570	3.3	6.9	*2,157		
Engine 500, without Gaines Wall		2,175	600	4.1	7.3	*2,982		

Pyrometer Locations A, B, C and D are with Gaines Wall.

Pyrometer Locations A', B', C' and D' are without Gaines Wall.

* Pounds of oil burned on trip Longview to Marshall, Tex.

that there was a gradual drop in temperatures as the flames approached the tube sheet. With the wall removed, the temperatures in the rear and middle portion of the firebox were fairly uniform, with a decided drop in the combustion cham-

ing them back into the rear portion of the firebox where combustion is most intense; whereas with the wall removed there was no such baffling effect and there was a noticeable short-circuiting of the flames from the burner over into the combustion chamber.

The temperatures shown are probably lower than might be expected in burning fuel oil under these conditions, but with the large volume of the firebox (433 cu. ft.) the heat liberation per unit of volume is reduced and therefore the temperature is reduced.

BOILER PERFORMANCE

Advantage was taken of the opportunity to make some determinations of the evaporative efficiency of a boiler, with and without the Gaines wall. The results of the test are summarized in Table II. With the wall in place, an average of 3,675 lb. of oil per hour was fired, with an apparent evaporation of 47,968 lb. of water; this being equal to an evaporation of 13.05 lb. of water per pound of oil and 12.47 lb. of water per square foot of heating surface. With the wall removed and the same front end draft, the average amount of oil fired was 4,142 lb., with an apparent evaporation of 46,842 lb. of water per hour, or 11.3 lb. of water per pound of oil and 12.18 lb. of water per square foot of heating surface.

The boiler horsepower generated per cubic foot of firebox volume averaged 4.2; while the equivalent evaporation per pound of oil averaged 17.03 with the wall and 14.8 without the wall, the corresponding boiler efficiencies being 85.5 and 74.3, or a difference of 13½ per cent in efficiency, due to the Gaines wall.

The boiler efficiencies are high, considering the rate of firing; but it should be borne in mind that in burning oil there is no loss through the grates and ashpan and no discharge of fuel at the stack in the form of cinders. With the wall in place, combustion was perfect; there being no indication of CO (Carbon monoxide) in the flue gases, and no black smoke issuing from the stack at any time. Under these conditions, practically all the heat loss will be accounted for in the front end gases; and, as shown in Table I, the front end temperatures were uniformly low, considering the length (18 ft.) of the tubes. A tube of this length, used in conjunction with a firebox equipped with a combustion chamber of ample length and volume, will give as low front end temperatures as longer flues used in conjunction with a firebox without a combustion chamber.

With the wall in place, the average front end temperature was 585 deg.; without the wall, 615 deg.; a difference of 30 deg., which accounts for a part of the efficiency shown by the wall. The wall seems to have little or no effect on the superheat in steam, as these temperatures average from 225 to 230 deg. with the wall in place to 225 to 235 deg. with the wall removed.

With the wall removed, smoke emission was very notice-

TABLE II—EVAPORATION, BOILER HORSEPOWER AND BOILER EFFICIENCY

Test No.	I. & N. Pyrometer	Oil—				Water—Apparent Evaporation				Equivalent Evaporation From and at 212 deg.			Boiler Horsepower	
		Gaines Wall	Lbs. Fired Per Hr.	Lbs. Per Hr. Firebox Volume	Lbs. Per Hr.	Lb. of Oil	Per Sq. Ft. Evap. Surf.	Lbs. Per Hr.	Lb. of Oil	Per Sq. Ft. Ht. Surface	Total	Per Cu. Ft. Firebox Vol.	Efficiency	
1	With	3,139	7.25	41,697	13.25	10.84	54,206	17.30	11.45	1,571	3.63	86.8		
2	With	4,004	9.25	52,720	13.16	13.70	68,536	17.11	14.48	1,986	4.59	85.8		
3	With	5,956	9.12	50,241	12.17	13.06	65,815	16.65	16.65	1,907	4.40	83.5		
4	With	3,607	8.33	47,216	13.09	12.27	61,852	17.14	13.07	1,792	4.13	86.0		
Ave.	With	3,675	8.49	47,968	13.05	12.47	62,602	17.03	13.22	1,814	4.19	85.5		
5	Without	4,135	9.56	47,500	11.48	12.35	62,225	15.05	13.15	1,804	4.16	75.5		
6	Without	4,008	9.25	46,036	11.48	11.97	60,307	15.04	12.74	1,748	4.03	75.5		
7	Without	4,164	9.61	44,607	10.71	11.60	58,435	14.03	12.35	1,694	3.91	70.4		
8	Without	4,261	9.84	49,227	11.55	12.80	64,487	15.13	13.62	1,869	4.31	75.9		
Ave.	Without	4,142	9.59	46,842	11.30	12.18	61,363	14.81	12.96	1,779	4.10	74.3		

ber space. At a point directly above the Gaines wall location, the temperatures were higher with the wall removed than when the wall was in place, this being due to the fact that the wall has the effect of baffling the flames and throw-

able; and there was considerable fuel wasted, due to the short-circuiting of the oil from the burner into the lower flues, partly unconsumed. Calculations based on the rate of flow of heat through fire brick and boiler lagging indicate

that less than 1 per cent of the fuel used was lost by radiation through the pan and through the boiler lagging.

Air used for combustion was drawn in through dampers 1 and 3, the pipe thimbles in the rear of the fire pan and the air ducts in the Gaines wall, as shown in Fig. I. Damper 2 was kept closed during the tests, as it was found that air admitted at this point caused a violent drumming in the firebox. The total effective air opening was 540 sq. in., and this was found sufficient to burn 4,000 lb. of oil per hour without making smoke. The gas analysis indicated an air excess of about 40 per cent.

Firebox volume is a very important factor in burning oil. These tests indicate that not more than 9 to 10 lb. of oil per cubic foot of firebox can be completely burned per hour. This is equivalent to 4 to 4½ boiler horsepower per cubic foot of firebox volume.

WASHINGTON CORRESPONDENCE

WASHINGTON, D. C., Sept. 18, 1917.

CO-OPERATION VS. COERCION

On the principle that co-operation is more effective than coercion, which is sometimes expressed by saying that "molasses catches more flies than vinegar," the railroads have abandoned their plans for endeavoring to obtain general increases in the tariff provisions as to carload minimum weights, through approval of the federal and state commissions, and will rely instead on the voluntary co-operation of shippers in the campaign for heavier loading of cars, which is showing such satisfactory results.

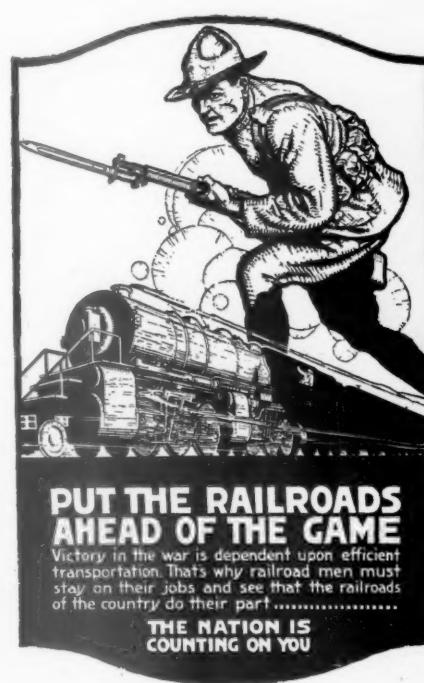
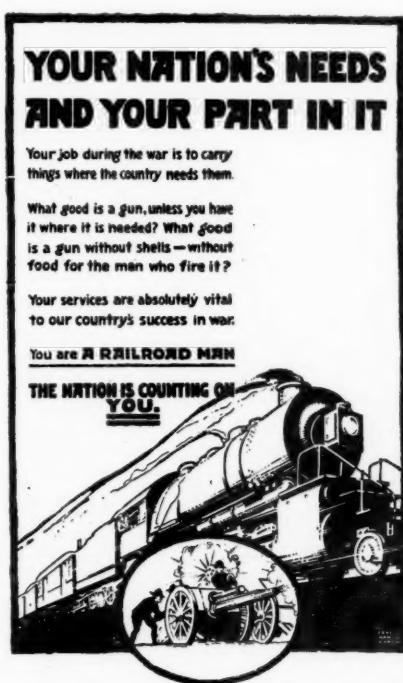
In other words, it has been decided that the efforts to make one freight car perform the service formerly performed by

out ways in which the efficiency of existing transportation facilities might be increased in the emergency created by the war, and as one of the most important ways in which efficiency could be increased, it was pointed out that a gain of only two tons in the average load per car would be equivalent to adding over 200,000 cars to the number available for public use.

Railroads were urged to "enlist the co-operation of shippers in loading cars heavier as a war measure, using the services of local agents, superintendents and assistant superintendents, traffic officers, etc., to approach them, concentrating effort on a few friendly ones at first to lead the movement and set the example." It was also suggested that traffic officers be urged to make a strenuous and concerted effort to get the consent of the public to increase carload minima, thereby increasing the weight of commercial units.

In accordance with the first plan, an active campaign has been carried on under the direction of the Commission on Car Service, with the hearty co-operation of the National Industrial Traffic League, the Railway Business Association, and many other large organizations and companies that ship a large tonnage of commodities, together with very material assistance from the Interstate Commerce Commission, many of the state railway commissions and the government departments. The traffic officials also began a concerted movement to revive their efforts to secure increases in the tariff minima, which commercial conditions and commercial habits have prevented from keeping up with the increases in car capacity.

The Western Classification Committee had gone so far as to docket a long list of proposed increases in minimum weights to be submitted to the shippers and later to the com-



Posters Emphasizing the Importance of Railways to the Conduct of the War

two partly loaded cars can be made more effective by a campaign of education and by asking shippers as a patriotic duty, as well as for their own interests, to use the full capacity of the available cars when more cars cannot be had, than by seeking to force them to load the small additional tonnage that the interstate and state commissions might allow to be added to the present minimum weights, as provided by tariffs and classifications.

One of the first steps taken by the Railroads' War Board was the issuance of its Efficiency Circular No. 12, pointing

missions and the Official and Southern Classification Committees had planned similar action about the time the Commission on Car Service discovered that its co-operative campaign was producing such results in the way of increased loading that it might not be entirely wise to arouse the antagonism of shippers by an effort to force increased loading by tariff requirements. This view was urged upon traffic officials and the Railroads' War Board, backed up with such convincing evidence of the results of co-operation that after a thorough discussion and many conferences the plan

of the traffic department was discarded for that of the operating men.

It was believed that if approval for any considerable increase in carload minima should be obtained it would be only at the expense of such opposition that the proposed minimum weights might, as a practical matter, come to represent also somewhere near the maximum loading. It was not expected that commissions would allow the minima to be fixed at anywhere near the maximum capacity of the cars, whereas at present many large shippers have issued orders to load to as high as 10 per cent above the marked capacity.

The monthly reports of freight operations compiled for the Railroads' War Board have already shown a remarkable improvement in car loading, although the latest reports, for the month of June, were for a time when the campaign had been in progress for only a few weeks. In June the average car load was increased by 2.7 tons, or 10.7 per cent.

As an example of the results being obtained, it may be stated that in the case of one commodity, on which the classification committee proposed to increase the minimum from 33,000 to 35,000 lb., the principal shippers have voluntarily agreed to load 65,000 lb., and in many instances are placing as much as 100,000 lb. in a car.

THE CO-ORDINATING COMMITTEE ON EXPORTATION

At the instance of the Railroads' War Board, a committee of unusual importance has just been formed to co-ordinate the activities of the railroads, the war department, the shipping board, the food administration and the war commissions of the British and other allied governments that come here to purchase supplies. The committee will be known as the "Co-ordinating Committee on Exportation" and its purpose is to expedite the handling of export shipments by preventing congestion at American seaports and minimizing the danger of export traffic being accumulated and delayed in railroad yards and along the tracks of seaport lines.

Bearing in mind the danger of congestion this winter if effort should be made to ship everything ordered in this country through the North Atlantic ports, the members of the War Board decided that some immediate action should be taken for co-ordinating railroad with overseas transportation.

With the view of laying the foundation for this, representatives of the embarkation section of the general staff, U. S. A., the traffic executive of the Allied governments, the United States Shipping Board, the United States Food Administration, the Red Cross War Council and the Commission on Car Service, met with the War Board and formed the "Co-ordinating Committee on Exportation."

This committee will consist of a representative of each of the organizations named, together with a representative of the Railroads' War Board. Charles M. Sheaffer, chairman of the Commission on Car Service, has been made chairman of the co-ordinating committee. The other members of this committee appointed to date include E. Level, chairman, Traffic Committee of the Allied Governments; J. G. Rodgers, general agent, American Railway Association, military headquarters; R. B. Stevens, commissioner, or D. L. Ewing, director of traffic, U. S. Shipping Board; Col. Chauncey B. Baker, embarkation section, general staff, U. S. A.; C. B. Buxton, U. S. Food Administration, and D. W. Cooke, Red Cross War Board. It is hoped that a representative of the U. S. Navy and of the British Admiralty will also become members of the committee.

The committee will hold regular meetings and will exchange the information necessary to prevent freight congestion, and at the same time keep the tremendous amount of traffic designed for overseas use moving to the various ports and thence by ship to Europe.

RAILROAD WAR POSTERS

Reproductions are shown of part of a series of colored posters prepared at the direction of the Railroads' War

Board, which have been placed in railroad shops and other places where large numbers of employees congregate, for the purpose of emphasizing the important part played by the railroads in modern warfare and the duty of every railroad man to exert his utmost to increase railroad efficiency.

COAL MOVEMENT

The monthly report of the Geological Survey on coal and coke movements on 72 roads for the month of August shows an increase in the shipments of bituminous coal on these roads as compared with July of 16,857 cars, or 2.5 per cent.; and an increase compared with August, 1916, of 68,570 cars, or 10.8 per cent. There were, however, 27 working days in August and but 25 in July. The average daily loading in August was 5.1 per cent less than in July. Daily and weekly reports received by the Geological Survey show that the average daily rate was at its maximum in the first week of July, descended to a minimum by the middle of August and has been slowly gaining since that time.

Judge R. S. Lovett, priority director, has received numerous requests from all parts of the country for priority orders for the shipment of coal, but has issued none since the first, pending the announcement by Fuel Administrator Garfield of his plan of apportioning coal. Meanwhile the Commission on Car Service has been able to give temporary relief to communities and industries in acute need of coal by securing a supply of cars, by expediting shipments and by diverting shipments to places where they were most needed.

Fuel Administrator Garfield on September 14 requested the Export Administrative Board to allow no coal to be exported from the United States without specific licenses, and further that the Board authorize no such licenses before notifying him of the application. This step was taken in order that he might keep in close touch with both the quantity and the destination of coal exports and specifically for the purpose of protecting the Northwest part of the United States, which has been complaining that it has not been receiving its fair share of the coal sent to lake ports. An investigation by the Fuel Administration substantiated this complaint. It was found that plenty of coal was reaching the Lake ports, but it was not getting through to the northwest. In the period between August 24 and September 6, out of a total of 1,755,812 tons, 530,973 tons, or 30.2 per cent had been shipped into Canada. This is far in excess of the proportion of Canadian exports by lake boats in normal times.

The Fuel Administration announced that it does not intend to cut off Canadian exports, but with this supervision it will be able to equalize the distribution of coal, and see that the Northwest and Canada both get their fair shares.

In other parts of the country the situation, while not as serious as in the Northwest, is giving Dr. Garfield concern. New England states, which draw their coal supply from the West Virginia fields by barge transportation from Hampton Roads, have not thus far received as much coal as usual at this time of the year. Seizure of coastwise shipping by the government has made more difficult the problem of supplying these states.

INCREASED RATES IN NEW SOUTH WALES.—In order to meet increased operating costs the Railway Commissioners of New South Wales are now asking for 10 per cent increase in rates and fares.

ARGENTINE-PERUVIAN AUTO MAIL SERVICE.—An automobile service has been put in operation from La Quiaca to points in Bolivia connecting with mail service to Peru. The Post Office Department has given notice that correspondents should indicate upon the cover of mail whether it is desired that it be forwarded to Peru via Chile or via the new automobile route.

National Safety Council Annual Congress

Railway Safety in a Multitude of Phases; Perplexities of Getting Good Work Done by Inexperienced Men

THE sixth annual safety congress of the National Safety Council was held at Hotel Astor, New York City, September 11, 12, 13 and 14. Readers of the *Railway Age Gazette* are interested mainly in the doings of the Steam Railroad Section of the congress; but on this occasion the principal address at the general session, Wednesday, September 12, was made by Marcus A. Dow, general safety agent of the New York Central Lines; and a report of this address was given last week, page 459.

The first session of the railroad section was held on Wednesday afternoon, and the acting chairman was H. J. Bell (C. & N. W.); W. C. Wilson, formerly of the Delaware, Lackawanna & Western, who was elected chairman of the section a year ago, has now retired from railway service. C. M. Anderson (N. C. & St. L.), acted as secretary of the meeting. Eighty-seven railroads now hold membership in the section, an increase of 38 per cent in the number since the last annual meeting.

The first paper was by J. S. Rockwell (B. R. & P.), on the relation of the safety department to war problems.

Participation in the war obviously requires increased endeavor in numerous directions. Some roads have increased and almost doubled the number of safety inspectors during the past year. The necessity of employing inexperienced men, now felt everywhere, imposes grave responsibilities. The new man must be trained; and must be trained with speed; to impress him with the dangers of his work he must be actually "shown"; mere words will not answer. The employment of women in shop and outdoor work introduces new problems; but thus far it is believed that, generally speaking, women are less careless than men. They should, of course, be surrounded by all requisite safeguards. In all matters within his province the safety agent must watch the superintendent and the foreman and see that they do not let down the bars because of the stress of war conditions.

In the discussion on this paper, R. C. Richards (C. & N. W.), spoke of the vast numbers of new men now coming into the service. On his road there is a constant stream. In Chicago an examining class is held every day and new men are taken on by the dozen. The "House that Jack Built" (motion picture), is shown to these men and safety rules are displayed on the screen for their benefit. The screen is also used for showing the good results of the safety organization on that road, with statistics of accidents, showing the improvement that has been made.

B. H. Dayton (N. Y. C.):—We require new men in train service to make three trips over the road and then to fill out a written paper. The man is required to tell what he has learned; then the inspector can clear up his doubts. A special code of safety rules, 40 in number, is used in instructing new men. Of course, we do not get obedience to these 40 rules without persistent questioning. All men, old as well as new, are shown the educational motion pictures; and attendance on these displays is now compulsory.

C. L. Wright (C. St. P. M. & O.):—For new men in the train service we allow three days for study of rules before deciding to accept a man. Written replies are made to a series of questions; and it is found that men who have filled out these blanks make fewer dangerous blunders than were formerly made by men of the same grade.

Replying to questions, a number of inspectors said that the way to discover violations of the rules was for the inspector to be on the job frequently.

C. M. Anderson (N. C. & St. L.) read a paper on the cost

of personal injuries in the matter of time lost. He cited cases where a man in an important position, for example a section foreman, was injured, and the case imposed on the company considerable cost by the necessity of taking a man from some other important work to fill his place, and then perhaps the filling of this second man's place added further disturbance of important work somewhere. The cost to the railroads of the country for personal injuries to employees in one year, as reported to the government, aggregated \$27,000,000. "We all know that 85 per cent of the casualties on railroads are due to carelessness. Officers must personally interest themselves in the problem of reducing this loss, and we, members of the safety organization, must remember that actions speak louder than words."

"Safety, loyalty and efficiency" was the title of a paper by L. E. Abbott (O. S. L.). The problem of the superintendent is to make men contented. Examples were cited of engineers, and others earning large pay for light work, joining in strikes or threats of strikes, even after they had professed their loyalty to the company. Money will not buy contentment. The employee can be expected to be interested in the company only as he is convinced that the company is interested in him.

A central employment bureau is essential to satisfactory selection and appointment of men for the train service. This central bureau should have the final word in the selection of men and also in discharges. The local petty tyrant must be eliminated. Making promotions for causes which cannot be justified will always make trouble. Why do we not more carefully train railroad officers? The government trains its officers, why should not we?

In the discussion L. Boslooper (Mich. Cent.) said that on his road the officers were getting the brotherhoods interested in safety first. Questions are discussed in the lodge meetings and written suggestions from the lodge officers are sent to the superintendent. These suggestions are promptly acted on.

"We enforce the use of goggles, but we do it largely by persuasion. We give the men to understand that this is required because the employer sees the need, not because of any state law or any legal question about liability. Shopmen must be made to understand that they, like other employees, even up to the president, have a duty to each other and a privilege; the privilege of working for the safety of all concerned. We have reduced by 65 per cent the number of injuries to workmen's eyes."

NEW MEN AND THEIR LIABILITY TO INJURY

T. H. Carrow, safety inspector, Insurance Department, Pennsylvania Railroad, presented a study on this subject, an abstract of which follows:

In normal times between 80 and 90 per cent of railroad employees are men who have had at least two years' service and the vast majority of these have many years' experience. Nevertheless, the number of men hired yearly to take care of the labor turnover on some of the larger railroads, even in dull times, is equal to 30 per cent of the total number in the service; while during the present year some railroads, particularly those located in the munition manufacturing districts, are having a yearly turnover equal to the average number of men making full time. After making due allowances, it is assumed that the turnover in the United States at the present time is equal to at least 900,000 men yearly. On the basis of reports made to the Interstate Commerce Commission

and the experience of a large railroad an estimate is made as follows:

Occupation	Number in service	Annual turnover
Station men, except agents.....	175,279	171,000
Train service men.....	329,799	99,000
Shopmen	407,729	180,000
Trackmen	397,053	387,000
All other employees.....	490,140	63,000
Total	1,800,000	900,000

On some of the larger roads about 33 per cent of the total number of injuries to employees occurring at the present time involve men who have been in the service less than six months, while nearly one-half of these occur to men who have been in the service less than thirty days. On the basis of reports made to the Interstate Commerce Commission for three months ending with September, 1916, it is estimated that there will be 3,024 fatalities and 192,788 injuries to railroad employees during the present year; and using the above percentage 64,618 of the injuries and fatalities will involve men with less than six months' experience while more than 30,000 will involve men with less than one month's experience.

Trainmen's work, getting on and off cars, walking on top of trains, setting and releasing hand brakes, coupling and uncoupling, etc., involves hazards which experience alone can teach a man to ward against. In train service, 19 out of every 100 fatalities are recorded as "struck by trains"; and when it is remembered that even the old and experienced men occasionally walk in front of moving trains, it is easily understood why the young and inexperienced man becomes a victim of this menace. And no amount of instruction will take the place of actual experience. * * * As well as the railroads would like to eliminate all short clearances it is a physical and an economic impossibility to do so. However, this is a hazard that can be readily pointed out to the new man. He must not permit his body to extend beyond the line of the cars, except when he has a clear and unobstructed view. * * * Among maintenance of way employees "struck by trains" is the cause of 68 out of every 100 fatal injuries. Loading and unloading rails, frogs and timber is always more or less hazardous even to the experienced man, but with the new man it is doubly dangerous. * * *

Accidents to freight station employees are less serious but more numerous. At some of the larger stations the ratio of injuries among freight handlers, alone, amounts to as much as 75 per cent yearly. Nearly all of the larger freight stations throughout the United States have had a labor turnover during the present year many times greater than the average number of employees in the service. At many stations the entire platform force has quit in a body, their places having been filled by men who had never before had any experience in freight station work. One large station employing 500 men, whose experience corresponds with many others had a turnover in the first 6 months of the year amounting to 2,500 men or five times the number on the pay-roll at any given time.

In normal times the labor turnover among motive power department employees is made up largely of unskilled labor, but the present demand for skilled labor has resulted in the working forces being greatly depleted. Until men become familiar with the layout of the shops they are less likely to ward against natural hazards. * * * Many shops are now employing women, but sufficient time has not elapsed to determine the relation the employment of female help bears to accident frequency.

An excessive amount of property damage is attributable to the inefficiency of new men, particularly in connection with shifting cars in yards. Recent inspections have shown that the damage to equipment during the present year in some cases is 100 per cent greater than in previous years. There

is also a marked increase in loss and damage payments attributable to the same conditions. This point is of great importance, as from a financial standpoint it will justify remedial measures that might be too costly under other circumstances.

The railroads of the United States are doing more business than ever before; there is an unprecedented shortage of men in all departments; large numbers of men are constantly entering and leaving the service; the liability to injury among inexperienced men is much greater than among experienced men; and the railroads must expect a continuance of present conditions.

THE LABOR SHORTAGE

Howard Elliott (Los Angeles & Salt Lake) commented on Mr. Carrow's paper substantially as follows:

Mr. Carrow's excellent analysis of the causes of accidents is a most valuable contribution to safety literature. We see that a large proportion of personal injuries are suffered by new men who take the places of old men that leave because they are dissatisfied with working conditions or rates of pay. Railways cannot afford to pay the high wages that are being paid by outside industries, and our efforts must be confined almost altogether to improving the working and living conditions.

Railroading is a system of voluntary relationships. Our employees stay because the glamor of the transportation business appeals to them, and because they know the work is steady. They go because of the higher wages or easier work. The problem of the railway officer today is to maintain good discipline tempered with generous treatment. Men must be made to feel that we appreciate their staying with us, and that we are glad to have them submit suggestions for improving the service. It is possible for officers to fraternize with employees in close fellowship without breaking down the discipline or *esprit de corps* of the organization. Witness the efficiency and splendid morale of the French army, where that system prevails. Inspired men will suffer, bleed, and die for a principle. We must inspire our men with the thought that transportation is as necessary in winning this war as bayonet charges. * * *

We should pursue a policy of full and free publicity regarding the affairs of our companies. Our employees should be given information about the capitalization of companies, who the stockholders are, what our plans are, and all that sort of thing. Vice-President Foley of the Illinois Central has just started a campaign of that kind, and it embodies an idea which I have long held.

We should have on every road an employment bureau where each man's record is carefully kept, and where square pegs are assigned to square holes. We should abolish government by chief clerks, and have orders issued only by men who have been on the ground and are able to visualize the men and the conditions affected by the orders. The issuing of orders by clerks who never get out on the road is taking the starch out of some of the best railroad men in the country.

We should hold open meetings of officers and employees where each man can voice his opinion about the conduct of the company's affairs. We must tell employees the *why* of every move required of them, and if we have practices that cannot stand the acid test of reason, the sooner they are abolished the better.

We should shun red tape as a pestilence. We should give the man on the ground all the authority that he proves himself capable of shouldering. We should cut out 50 per cent of our letter writing. Is it a far cry from red tape to new men? New men are hired to take the places of old men who have become dissatisfied with conditions. Nothing creates dissatisfaction so quickly as a system of red tape which dwarfs the initiative of the individual.

We should provide places of amusement at terminals, a

Young Men's Christian Association, or club rooms where men can spend their time when off duty in wholesome pleasures. We should assist in every way practicable in the passage of laws promoting temperance. The saying is: "The Lord looks after drunken men and babies," but the records of personal injuries on our roads bear mute testimony to the falsity of that proverb.

We should build good houses for our section forces, and provide good accommodations for freight handlers, such as smooth floors in our warehouses, good trucks and adequate facilities for comfort. We should be liberal in the granting of passes. Instead of a rule requiring five years' service for a trip beyond Chicago, reduce it to two. We should have a system of increasing the pay of laborers the longer they stay and should grant bonuses to men who stand head and shoulders above their fellows in performance. We should encourage employees to subscribe for educational courses, and make it easy and inexpensive for them to do so.

Pressure should be brought to bear on Congress to waive the literacy test for track and shop laborers, the same as has been done with agricultural workers. A man doesn't need to know how to read in order to handle a pick or a shovel. The agreement about admitting Asiatics should be revised so as to permit 200,000 of them to come to this country under a bond providing for their return at such time after peace shall be declared as Congress shall prescribe. Japanese section foremen in the West are excellent workers, and they get along well with Mexican laborers. Chinese make good track men; they are quiet, of good disposition, and do not often get drunk.

There is a tremendous amount of needed improvement work on railways which has been authorized but not commenced because of no laborers. Allowing 200,000 Chinese to come into this country for the duration of the war may easily mean the sending of 200,000 fewer of our own beloved Americans to bleed and die on the fields of France.

DISCUSSION

S. G. Watkins (B. & M.): Accidents do not happen; they are manufactured. In nearly every case somebody fails to do what he knew should be done. The experienced foreman should be made to understand that he is responsible for the conduct, as regards their own safety, of inexperienced men. Let us put forth a mighty effort to improve our experienced men.

A number of members spoke of the perplexities incident to the present scarcity of good men. In freight houses and on track work some men who are hired will quit the same day, and many on the first pay day. Other large roads quoted figures concerning "turnover" as striking as those given by Mr. Carrow. In some yards the damage to freight cars has increased 100 per cent.

E. J. Birmingham (Erie): Among other measures to keep workmen contented on track work, we have a camp train with a good cook, a chef from the dining car department. Men without money are helped to get board and other accommodations until they can earn a little. Members of the safety committees on the Erie are allowed a bonus over and above their regular pay; this keeps them alert. The Erie now has employed in its shops 140 women, and during the three months that they have been in the service there have been 45 injuries to women. An improvement has been made in first aid kits by introducing smaller boxes; many such outfits have a larger number of articles than are needed.

In connection with this discussion, the New York Central's poster showing dangers at highway grade crossings was passed around among the members. W. H. Cameron, secretary of the National Safety Council, Chicago, has arranged to have copies of this poster printed in one color at five cents each for 6,000 copies and at lower prices for larger quantities. In three colors the prices would be higher.

ACCIDENTS IN GETTING ON AND OFF CARS

This was the title of a paper by C. H. Baltzell, superintendent of the St. Louis-San Francisco at Fort Smith, Ark. Few men habitually get on and off properly. The use of the oil box as a step should be forbidden. Men should be cautioned against catching the front end of the caboose. Every superintendent should make a strong crusade, as has been done by street railroads in cities, to instruct passengers how to get on and off.

Many personal injuries are due to what may be called a remote cause, namely, the neglect of men to rest properly when they are off duty. Men sometimes are tired out before they have half completed their trip. The railway officer must consider home conditions. Many times a careless man can be made more careful by having him bring his wife to the office for a conference. On the Frisco there is a woman's league for safety first. The division officer must take personal interest in safety; notice all disregard of rules and talk to the offender in a business-like and sincere way. The officer should discourage mischievous tattling. The officers themselves, if alert, will see violations of rules with sufficient frequency to be able to correct wrong practices.

Under the present war conditions the teaching of new men is an everyday duty. Go into the smallest details. The new man has the difficult task of learning in three months that which we learned in three years. Encourage athletic activities among employees. The athletic man is more careful and safe than one who is untrained; he learns to cultivate presence of mind, which is a main element in avoiding bodily injury to oneself.

Cultivate the young men; this will improve you as well as the young man. Encourage him to come to your office.

In the discussion on this paper H. J. Bell (C. & N. W.) explained the form for reporting personal injuries now in use on his road, based on that which was recommended at the congress last year in Detroit. Accidents which afford specially striking lessons, such as when an experienced conductor jumps off his train in front of one on another track, are made the subject of special safety bulletins, to be sent all over the system. The North Western has bulletin boards at 400 places. Besides posting on these boards, copies are sent to individual employees.

A desultory discussion on the right way to get off a moving train resulted in a good deal of difference in opinion and it was voted to have the secretary gather information on this point.

OTHER PAPERS

Accidents in Use of Tools and Machinery was the subject of a paper by David More (U. P.). Mr. More called attention to the great progress in the promotion of safety which has been made by the introduction of improved tools. For example, the electric overhead crane has done away with many injuries. The electric flue welder eliminates danger from flying sparks.

All tools are inspected monthly, and the inspector has to make a written report to the foreman. The Union Pacific has spent \$20,000 for guards on machines. The speaker invited all members to visit his shops and to criticize as severely as they could. Two kinds of men must be eliminated, the satisfied man and the dissatisfied man; the man who is wanted is the unsatisfied man. He is the man who is bigger than his job and who will progress.

Proper Handling of Track and Bridge Material was the subject of a paper by J. T. Broderick (B. & O.). Unskillful handling of rails and heavy timbers is a chief cause of accident to workmen in this department. An air hoist should be used, wherever possible, in unloading rails. Rails should always be loaded with heads up and with wooden strips between. In lifting rails from the ground tongs

should always be used. The speaker gave careful details of the right way to use rail laying machines and other appliances. The foreman who avoids hasty language is an important safety asset. Work should be discontinued when a train passes on any adjacent track. Tie tongs should be used in lifting ties, especially treated ties. Gloves must be used where necessary to avoid poisoning of the hands. Self-dumping ballast cars are a desideratum; men are injured in using old and unsuitable cars. In the discussion on this paper C. B. Floyd (N. Y. C.), emphasized the necessity of talking safety every day; the safety inspector should perform his duties before the eyes of the workmen. This inspector can make or break all our safety records.

Safe Operation of Hand and Motor Cars was the subject of a paper by S. G. Watkins (B. & M.). On the Boston & Maine the accident record has been reduced by abolishing iron handles on hand cars and using first quality hickory, the handles being made in the company's shops. Also, the foremen are directed to test handles occasionally. All motor cars have been fitted with a rail across the front, 18 inches high. Foremen should be instructed in the proper loading of motor cars; they must not be over loaded; men must not sit on the front end where a quick stop would throw them to the ground and they would be run over. Tools and other things carried on the cars should be made secure in their position. Always have the men seated before starting the car. Excessive speed must constantly be guarded against; foremen often run 30 or 40 miles an hour without realizing the speed. Foremen must inform themselves fully as to the right to the road before they start out; impatience because operators do not get information promptly is a fault to be guarded against. Bulletins telling of accidents which occur, and containing suitable admonitions are circulated frequently among the men.

In the discussion of this paper, F. N. Loughnan (L. V.) described experiences on his road under war conditions. Track foremen have difficulty nowadays in keeping competent flagmen in service. The supervisor has difficulty in finding foremen who are good leaders of men. Many times the explanation of ill-success in the case of a foreman is that he has a disagreeable personality. The Lehigh Valley limits the speed of motor cars rigidly to 20 miles an hour; and has had no trouble from excessive speed. The men in charge are required to have a knowledge of road rights as good as that of trainmen. There are fewer accidents in the use of motor cars than with lever cars. Every foreman has at hand a telephone, either at his car house or in the shape of a train telephone to carry on the road, so that he can communicate with the dispatcher at any time.

A section should have a car of sufficient capacity for its work; use a trailer for tools if necessary. A foreman should be competent to inspect his car in detail and should do so every day. The motor cars on this road have two-inch blocks at the edges to prevent bars and other tools from falling or sliding off. Pick handles are taken out of the picks so that they will require less space and be carried more safely.

Protection of Men Working on Tracks was the subject of a paper by S. S. Morris (Ill. Central). Everything depends on the foreman. The first-class foreman has no scarcity of men and he makes very few reports of employees injured. One of his chief difficulties is handling men who are too young or too old; these constantly require his attention.

In the discussion on this paper R. C. Richards (C. & N. W.) said that on his road, when an employee is injured, a letter is sent to the victim and also to each man in his crew to impress that particular lesson at the right time.

S. G. Watkins (B. & M.): I make monthly studies of the accident records, taking a different class of men or of accidents each month; and give the results to the 150 members of safety committees.

F. W. Mitchell (N. Y., N. H. & H.): On our road every employee who is injured sufficiently to lose time, must, before again going to work, appear in person before the superintendent (or in the case of a shopman, before the shop foreman). The superintendents agree that these interviews are profitable.

INSPECTION OF CARS AND ENGINES

This was the subject of a paper by C. A. Cochrane, superintendent of safety of the Great Northern. The foreman of inspectors must be an enthusiast. All instructions must be in plain language; talk concrete things. Men should be instructed by rehearsing at length the procedure required in the inspection of cars. Inspectors should examine lading as well as cars, especially where the lading is on two cars. Look out for holes in the floors of stock cars, searching on the underside. The speaker presented a long and careful statement of the things to be attended to by the inspector of locomotives.

The election of officers of the steam railroad section resulted in the choice of H. J. Bell (C. & N. W.) as chairman; T. H. Carrow (Penn.), vice-chairman, and C. M. Anderson (N. C. & St. L.), Nashville, Tenn., secretary.

EXHIBITS

In connection with this congress, a display of safety devices was shown in the Grand Central Palace, Lexington avenue, the exposition being managed jointly with the American Museum of Safety, of New York City. Following are the names of the proprietors of some of the exhibits which are of special interest to railroad men:

Acar Mfg. Co., New York, N. Y. Blue flag signal.
 American Abrasive Metal Co., New York, N. Y. Safety treads.
 American Mason Safety Tread Co., Lowell, Mass. Safety treads.
 Anti-Saloon League, New York.
 Baltimore & Ohio Railroad.
 Clipper Belt Lacer Co., Grand Rapids, Mich. Belt lacers.
 Commonwealth Steel Co., St. Louis, Mo. Passenger car upright end-frame, etc.
 Detroit Fuse & Mfg. Co., Detroit, Mich. Safety motor starting switches.
 Durand Steel Locker Co., Chicago, Ill. Steel locker.
 Edison Storage Battery Company, Orange, N. J.
 Fire Gun Co., New York, N. Y. Fire extinguishers.
 First Aid Equipment Company, New York.
 Fyr Fyter Company, Dayton, Ohio. Fire extinguishers.
 Hardy & Co., S. H., New York. Goggles.
 Julius King Optical Co., New York, N. Y. Goggles.
 Krantz Mfg. Co., Inc., Brooklyn, N. Y. Safety locked switches.
 Merry Optical Co., Kansas City, Mo. Goggles.
 Metropolitan Electric Mfg. Co., Long Island City. Panel switch boards.
 Mine Safety Appliance Company, Pittsburgh, Pa. Assortment of danger signs.
 New York Central Railroad.
 New York Edison Company.
 Norton Company, Worcester, Mass. Grinding wheels.
 Palmer Electric & Mfg. Co., Boston, Mass. Electric switches.
 Peelle Co., Brooklyn, N. Y. Fireproof self-opening freight doors.
 Pyrene Mfg. Co., New York, N. Y. Fire extinguishers.
 Southern Railway Company.
 Standard Optical Company, Geneva, N. Y. Goggles.
 Standard Pressed Steel Co., Philadelphia, Pa. Shaft hangers.
 Strong-Kennard & Nutt Co., Cleveland, Ohio. Goggles.
 Universal Safety Tread Co., Waltham, Mass. Safety treads.
 West Disinfecting Co., New York, N. Y. Disinfectants.
 Western Electric Co., New York. Davis flood lights.
 Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Shop safety appliances.
 Wilson, T. A. & Co., Reading, Pa. Goggles.
 Woolf Laboratories, Inc., New York, N. Y. Disinfectants.

Motion pictures were shown at the exposition in the afternoon and evening, among these being "The Rule of Reason," recently brought out by the New York Central, and another picture showing the welfare activities of the Baltimore & Ohio.

TRADE WITH RUSSIA GROWS.—Exports from this country to Russia increased from \$31,000,000 in 1914 to \$558,584,000 in 1917, according to a compilation by the National City Bank. This increase since 1914, while largely war material, included also railway supplies and material, automobiles, metal working machinery, leather, copper, steel rails, railway cars, wire, and miscellaneous manufactures of iron and steel.

RESULTS OF THE M. C. B. LETTER BALLOT

At a meeting of the Executive Committee of the Master Car Builders' Association, held in Chicago on June 14, 1917, a letter ballot containing 108 questions suggested by the various committees was formulated to be submitted to the members of the association. Of these 108 questions five were rejected by the members, as follows: Specifications for journal box packing, the need for specifications covering freight car lubricants, the revision of section 41 in the specifications for lumber, the advancement of journal bearings for passenger and freight equipment to standards, and the revision of M. C. B. sheet U-11 regarding the pulleys,

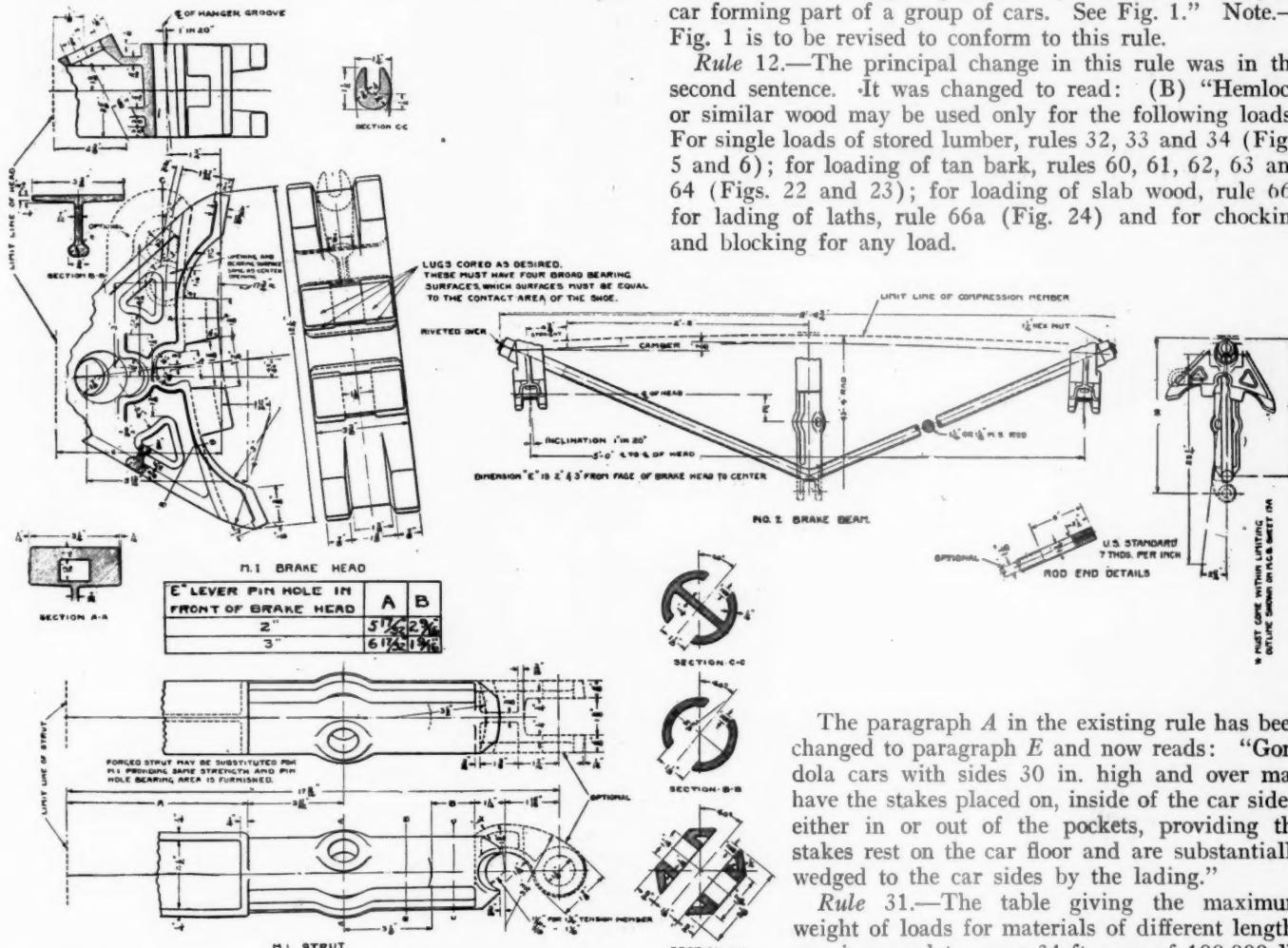


Fig. 1—No. 2 Brake Beam Adopted as Recommended Practice by the M. C. B. Association

pulley seats and pulley keys for electric lighting equipment of passenger cars.

Following is an outline of the more important questions submitted to letter ballot which were accepted:

STANDARDS AND RECOMMENDED PRACTICES

The following items listed in the 1916 proceedings as recommended practices are advanced to standards:

Specifications covering dimensions and tolerances for solid wrought steel wheels for freight and passenger car service.

Minimum thickness for steel tires.

Wheel tread and flange for steel and steel tired wheels.

Wheel circumference measure for steel and steel tired wheels. (It was voted to have this measure cover steel, steel tired and cast wheels, thus eliminating the circumference measure for cast iron wheels shown on sheet M. C. B. 16-A.)

Rotundity gage for solid steel wheels.

Plane gage for solid steel wheels.

Lining for outside-framed cars.

Sizes and dimensions for solid steel wheels. (It was also voted to change the name to wrought steel wheels.)
Truck side bearing clearance.

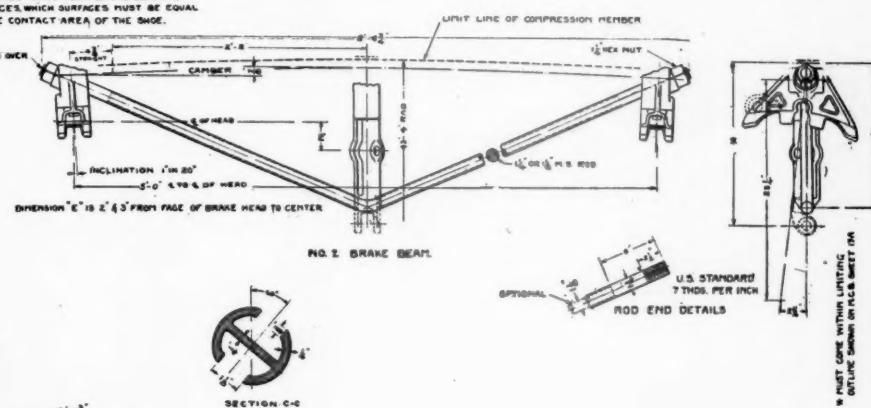
Limiting Dimensions for Pedestal Jaws for Cast Steel Truck Sides.—It was voted to change the limiting dimensions B for the 70-ton truck frame which are given on M. C. B. sheet 8 to the following:

Truck frame, maximum 5 15/16 in., minimum 5 5/8 in.
Journal box, maximum 6 1/16 in., minimum 6 in.

LOADING RULES

Rule 9.—Rule 9 has been changed to read: "Lading on single cars must never project over the end sill of the car unless such overhang is protected by an idler or carrying car forming part of a group of cars. See Fig. 1." Note.—Fig. 1 is to be revised to conform to this rule.

Rule 12.—The principal change in this rule was in the second sentence. It was changed to read: (B) "Hemlock or similar wood may be used only for the following loads: For single loads of stored lumber, rules 32, 33 and 34 (Figs. 5 and 6); for loading of tan bark, rules 60, 61, 62, 63 and 64 (Figs. 22 and 23); for loading of slab wood, rule 66; for lading of laths, rule 66a (Fig. 24) and for chocking and blocking for any load.



The paragraph A in the existing rule has been changed to paragraph E and now reads: "Gondola cars with sides 30 in. high and over may have the stakes placed on, inside of the car sides, either in or out of the pockets, providing the stakes rest on the car floor and are substantially wedged to the car sides by the lading."

Rule 31.—The table giving the maximum weight of loads for materials of different lengths was increased to cover 34-ft. cars of 100,000 lb. capacity, 40-ft. cars of 80,000 lb. capacity and 40-ft., 42-ft., 44-ft. and 46-ft. cars of 110,000 lb. capacity.

Rule 33.—In the first line after the word equal, change the word "width" to "thickness" and add after the word "side," in the eighth line, the following: "Provided that strips will not be required if load does not extend more than 30 in. above the top of car sides."

Rule 34.—Section D is changed to read as follows: "For loads of lumber lapped or stripped in accordance with rule 33, size of hardwood stakes must not be less than."

Rule 58.—The second paragraph of this rule has been changed to read as follows: "When lading is in two piles on flat or gondola cars and ends of poles are interlaid at center of car as per Figs. 18, 19, 20 and 21, there must be not less than three pairs of stakes per pile, or six pairs of stakes for the total length of load." Figs. 18, 19, 20 and 21 are to be revised to conform to these changes.

Rule 67.—A note has been added to this rule reading

as follows: "Sawed ties of more than 12 ft. in length may be loaded on flat cars, subject to the rules governing the loading of lumber on open cars."

"Hewn ties more than 12 ft. in length may be loaded on flat cars, subject to the rules governing the loading of logs, piling, props, telegraph and telephone poles."

Rule 81-C.—In the third line change the size of the top clamp from 2 in. by 4 in. to 4 in. by 6 in.

Rule 93.—The following note has been added to this rule: "The metal sliding plate used in connection with twin or triple loads of flexible material should be greased at interchange points to facilitate the curving of the cars."

Rule 124.—A paragraph has been added to this rule as follows: "Lading in vehicle cars with end doors must be securely protected against end shifting and loaded in such a manner that the lading will not come in contact with the end or side doors."

TRAIN BRAKE AND SIGNAL EQUIPMENT

It was voted to change the rules covering the adjustment of piston travel to read as follows: "Piston travel should be adjusted to not less than 6 in. nor more than 8 in."

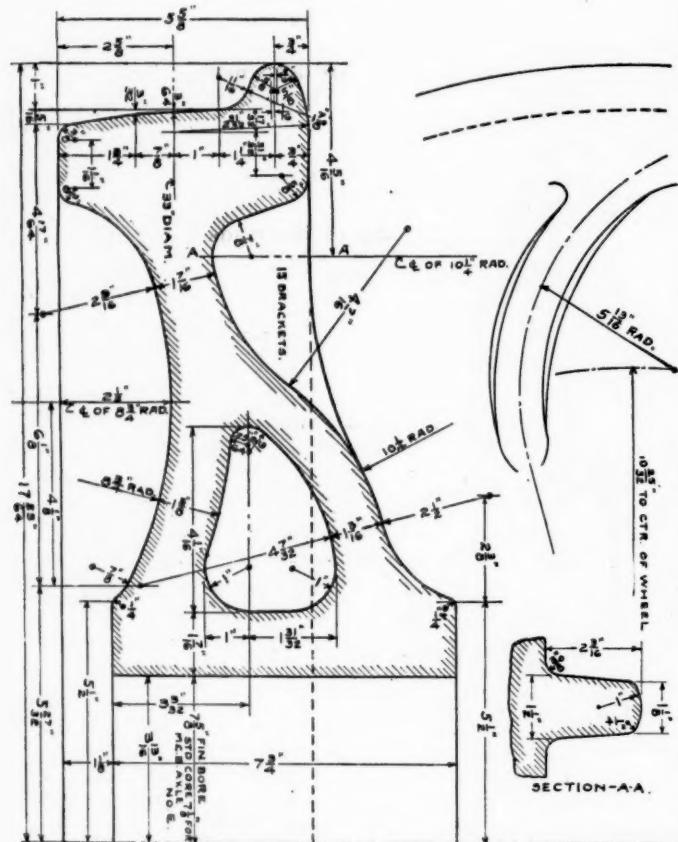


Fig. 2—Cast-Iron Wheel for Cars of Maximum Gross Weight Not to Exceed 210,000 lb.

The K-1 triple valve for 8-in. and the K-2 triple valve for 10-in. air brake equipment were advanced to standards.

SPECIFICATIONS

The specifications for the following material were adopted as recommended practice: Black paint; elliptical springs; insulation paper for refrigerator cars.

The paragraph regarding "deflection test" was added to section 4 of the specifications for air brake hose gaskets. The specifications for helical springs were rewritten. A slight change was made in the specifications for steam heat hose for passenger equipment cars, steel axles, air brake and train air signal hose.

The knuckle pivot pin specifications were eliminated, being substituted by the specifications for heat-treated knuckle pivot pins and these were advanced to standard. The requirement for silicon was omitted from the specifications. A few changes were also made in the specifications for lumber.

The following specifications were advanced from recommended practice to standard:

Carbon Steel Bars for Railway Springs.
Rivet Steel and Rivets for Passenger and Freight Equipment Cars.
Mild Steel Bars for Passenger and Freight Equipment Cars.
Chains.
Cement for Mounting Air Brake Hose.
Galvanized Sheets for Passenger and Freight Equipment Cars.

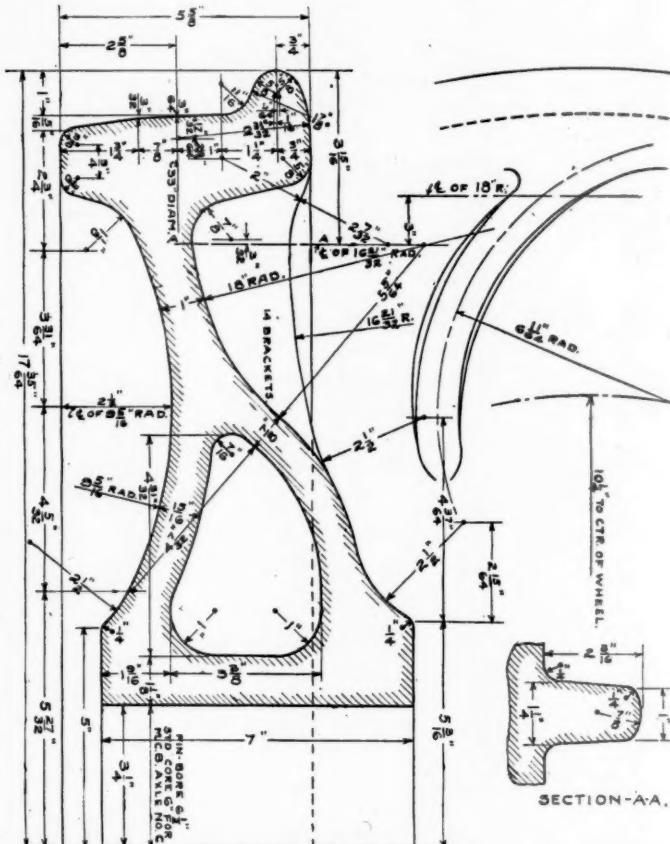


Fig. 3—Section of 700-lb., 33-In. Cast-Iron Wheel Adopted to Replace the 675-lb. Wheel

Structural Steel, Steel Plates and Steel Sheets for Passenger Equipment Cars.

Structural Steel, Steel Plates and Steel Sheets for Freight Equipment Cars.
Welded Pipe.

BRAKE BEAM AND BRAKE SHOE EQUIPMENT

No. 2 Brake Beam.—The brake beam committee succeeded in designing a No. 2 brake beam which, with certain limitations, has been accepted by the association as recommended practice on a close vote, 1,425 voting in favor of it, 673 against it, with 1,399 votes being necessary for adoption. This has been accepted with the understanding that a future report will be made on the compression member and its attachment to the head and strut members. The beam is shown with its details in Fig. 1. It is further understood that this beam is adopted only as a progress design as the final requirements have not been worked out by the committee.

No third point suspension is shown and it is optional in providing a 1 1/8-in. opening at the end of the strut casting for supporting this portion of the beam by any means desired by any road, but it is not compulsory in the construction. A tabulation of the malleable brake heads which are

being put on beams developed the fact that they weigh all the way from 6½ lb. to 21 lb. apiece, with the result in the first case that the shoe cracks and works out, and in the second case an unnecessary amount of malleable iron is being purchased. In the design of the brake head, the pot-hook opening is shown at the center as the committee feels that the center hanging is correct. However, an optional location shown by dotted lines in Fig. 1 for the pot-hook opening at the upper end of the head is permitted. The specifications and tests of brake beams were also revised.

CAR WHEELS

The 33-in. cast iron wheel shown in Fig. 2 was adopted as recommended practice for cars of maximum gross weight not to exceed 210,000 lb.

The 33-in. 700-lb. cast iron wheel shown in Fig. 3 was adopted as recommended practice in place of the present 675-lb. wheel of the same diameter.

TRAIN LIGHTING AND EQUIPMENT

The following paragraphs of the specifications for electric lighting of passenger equipment cars, were advanced from recommended practice to standards:

- Paragraph 1. (System voltages.)
- Paragraph 5. (Mounting.)
- Paragraph 6. (Axe pulley and bushings.)
- Paragraph 9. (Size of ball bearings.)
- Paragraph 10. (Boxes, design.)
- Paragraph 12. (Dimensions of battery trays.)
- Paragraph 13. (Connections.)
- Paragraph 14. (Charging receptacles.)
- Paragraph 16. (Terminals.)
- Paragraph 19. (Switchboards.)
- Paragraph 20. (Fuses.)
- Paragraph 21. (Insulation of conduit and wire.)

It was voted to substitute an open end link fuse for the closed end link fuse now shown under these specifications.

TANK CARS

A number of changes were made in the specifications for tank cars, most of which are minor in character and as a rule do not change the substance of the present requirements. A new set of specifications called Class V Tank Car was adopted for the use of chlorine and sulphur dioxide.

115,000 FREIGHT CARS DISTRIBUTED

Fairfax Harrison, chairman of the Railroads' War Board, has authorized the following statement:

Some conception of the efforts which the railroads of this country are making to handle the tremendous increase in freight traffic which the war has produced may be gleaned from a report just compiled by the Commission on Car Service.

The report shows that during the four months' period between May 1 and August 31, this year, 115,152 empty freight cars were ordered into the South and Southwest to protect the movement of grain and other food products and assure the prompt delivery of the millions of feet of lumber needed by the government for the cantonments and shipyards. Several thousand of these cars were also used to facilitate the movement of phosphate rock and other materials needed in the manufacture of munitions. The cotton carrying railroads also received large consignments of "empties" to enable them to meet the beginning of the cotton and cotton seed movement. Most of the cars moved into the South and Southwest are owned by roads operating in other sections of the country. They were moved, however, regardless of ownership into the districts where they were most needed. The prompt compliance of the roads owning them with the orders of the Commission on Car Service averted what might easily have been one of the worst freight congestions in the history of the country, as the lines in the South and Southwest have been called upon to transport an unexampled volume of freight since the United States entered the war.

The movement of lumber for commercial purposes has been

unusually heavy and added to that has been the government's demand for the 64,000 carloads of timber needed in the construction of the training camps for the new national army and the thousands of other carloads that are being rushed from the Southern forests to the shipyards of the Atlantic coast.

Coincident with the lumber movement, grain, melons, vegetables and other food products have created a demand for cars that would have been impossible to meet if the railroads of the country had not voluntarily agreed to merge their competitive activities and operate as one system during the period of the war. This agreement made possible the shifting of empty cars into districts that would have been virtually buried under the abnormal amount of freight accumulated in them if the local lines had not received help from their competitors.

At the present time hundreds of empty cars are still being rushed into the South to assure the prompt movement of all government orders for lumber. Hundreds of other "empties" are going into the Central States to protect the grain crop, the transportation of which is now being complicated by the fact that during the next six weeks, when the grain movement will be at its height, the railroads will be obliged to run a large number of special passenger trains to carry the 687,000 citizen soldiers to the cantonments.

Long trains of stock cars are also moving into Western Texas, so that the thousands of heads of cattle that are threatened by the drought there may be moved into more fertile pasturage.

The railroads operating in Maine will soon receive an extra consignment of empty cars to enable them to handle the potato crop. A summary of the roads that receive consignments of empty cars from other roads during the four months' period ending August 31, together with the number of cars sent to each, is as follows:

Alabama & Vicksburg, 750; Alabama, Tennessee & Northern, 1,012; Atchison, Topeka & Santa Fe, 500; Atlanta, Birmingham & Atlantic, 1,275; Atlantic Coast Line, 8,500; Carolina, Clinchfield & Ohio, 800; Central of Georgia, 2,400; Charleston & Western Carolina, 250; Chicago Great Western, 1,500; Chicago & Alton, 1,225; Chicago, Findlay & Fort Wayne, 200; Chicago & Eastern Illinois, 1,395; Chicago & Northwestern, 500; Chicago, Indianapolis & Louisville, 250; Chicago, Peoria & St. Louis, 200; Chicago, Rock Island & Pacific, 3,600; Chicago, St. Paul, Minneapolis & Omaha, 1,500; Cincinnati, Bluffton & Chicago, 16; Cincinnati, Indianapolis & Western, 1,300; Delaware & Hudson, 48; Fort Worth & Denver City, 118; Georgia, 575; Georgia & Florida, 575; Georgia, Florida & Alabama, 30; Georgia Southern & Florida, 250; Gulf Coast Lines, 2,125; Gulf, Florida & Alabama, 275; Gulf, Mobile & Northern, 650; Gulf & Ship Island, 870; Illinois Central, 8,640; International Great Northern, 159; Kansas City, Mexico & Orient, 1,530; Kansas City Southern, 200; Lake Erie & Western, 300; Louisiana & Arkansas, 700; Louisville & Nashville, 10,497; Louisiana Ry. & Navigation Co., 1,212; Memphis & Meridian, 250; Minneapolis & St. Louis, 1,050; Missouri, Kansas & Texas, 2,200; Missouri & North Arkansas, 300; Missouri Pacific, 6,241; Mississippi Central, 685; Mobile & Ohio, 7,953; Nashville, Chattanooga & St. Louis, 4,350; New Orleans Great Northern, 700; Norfolk Southern, 1,909; Richmond, Fredericksburg & Potomac, 200; San Antonio & Aransas Pass, 250; San Antonio, Uvalde & Gulf, 183; Seaboard Air Line, 3,500; Southern, 8,277; Southern Pacific, 1,800; Soo Line, 1,400; St. Louis & San Francisco, 2,165; St. Louis Southwestern, 8,003; Sunset Central, 1,687; Tennessee Central, 100; Texas Mexican, 158; Texas & Pacific, 1,205; Toledo, Peoria & Western, 450; Toledo, St. Louis & Western, 459; Tremont & Gulf, 100; Union Pacific, 250; Vandalia, 200; Wabash, 2,500; Western Maryland, 200; Western Pacific, 500.

Roadmasters' Thirty-fifth Annual Convention

Abstracts of Committee Reports and Papers Presented at the Meeting Which Was Held This Week in Chicago

THE thirty-fifth annual convention of the Roadmasters' and Maintenance of Way Association was held at the Auditorium Hotel, Chicago, on Tuesday, Wednesday and Thursday of this week. The meeting was characterized by unusual interest in the reports and papers presented. Because of the unusual conditions in the maintenance of way department which have arisen during the past year, the program for this convention was revised radically at a meeting of the executive committee held in July to concentrate attention upon those phases of the present situation which are of the greatest concern to track men.

The officers of the Association during the past year were: President, M. Burke, roadmaster, Chicago, Milwaukee & St. Paul, Chicago; first vice-president, A. Grills, general roadmaster, Grand Trunk, St. Thomas, Ont.; second vice-president, J. B. Oatman, roadmaster, Buffalo, Rochester & Pittsburgh, Du Bois, Pa.; secretary, P. J. McAndrews, roadmaster, Chicago & North Western, Sterling, Ill.; treasurer, W. H. Kofmehl, Elgin, Ill.

The convention was called to order at 9:30 Tuesday morning by President Burke and all addresses of welcome and similar formalities were eliminated. President Burke outlined the reasons for holding the meeting this year, describing the difficulties which confronted the roads and emphasizing the importance of the opportunity offered at the convention for thorough discussion. He emphasized the necessity of maintaining the track as well as possible under present adverse conditions with the acute labor shortage, lack of many materials and unusually heavy traffic.

R. H. AISHTON SPEAKS

R. H. Aishton, president of the Chicago and North Western and chairman of the Central Department of the Railroads War Board, outlined the manner in which the railways handled troops and materials to the Mexican border last year. He described the prompt action of the roads in organizing for the present war and described the manner in which they have co-operated in handling unusually heavy business without interference with the prompt movement of troops and military supplies. He emphasized particularly the excellent co-operation of the railway employees of all classes in helping to win the war. He predicted serious times ahead for all railway men, stating that precedents are worthless and that each problem must be solved on the basis of present-day conditions as it arises. American roads are taking up slack and are subordinating their interests to those of the country.

SECURING AND RETAINING TRACK LABORERS

It goes without saying that the first and best method of securing laborers to work on tracks is to offer them inducements equal or superior to those tendered by other companies or individuals employing similar help, while to retain them after we do secure them, we must accord them privileges and permanent employment consistent with the best interests of the employer and employed. On sections or other locations where labor headquarters are permanent every effort should be made to encourage trackmen, either laborers or foremen, to own their own homes. A foreman should be assured of the permanency of his position by his superiors and he, in turn, should impart such knowledge to the men under him to make them feel that they have an interest, not only in their work, but in their home town. The number of men should be the same in winter as in

summer. No more pernicious custom obtains than that of keeping the men in a section gang guessing during the summer months as to who will be retained and who will be laid off when the first snow begins to fly.

Section foremen should be permitted to hire their own men, and when there are laborers who cannot or will not rent or live in houses of their own, they should be provided with a bunk house at a location convenient to the work and where a certain amount of privacy is insured. This camp should be equipped with a cooking range and other necessary fixtures. A cook of the same nationality as the men should be secured who is able to cook good, wholesome meals.

When a foreman cannot secure his own laborers, they should be furnished by the railroad's authorized agent, but the labor agent's connection with the men should end there. The custom of having the labor agent furnish the victuals and wearing apparel of the men should be discouraged, as this system often results in charges and deductions against the laborer's wages that the men do not know of and in many cases do not owe, causing no end of trouble on pay day. Men for extra forces or floating gangs should be hired by the foreman of the gang when possible, but if he is unable to do so, they should be furnished by an accredited agent employed by the company on a salary, to preclude, as far as possible, the practice of charging men commissions for their jobs.

Bunk shanties or cars should be provided with double-deck steel bunks, good ventilation, wash basins, water coolers and other facilities. The dining car, or dining room should be well ventilated and sanitary and the cooking cars or compartments provided with all necessary utensils and ample storage for supplies. These camps should be conducted by a boarding contractor who will provide them with plenty of good, wholesome food and who will also see to the sleeping accommodations.

If Italian labor is used, the above arrangement may not apply, as these men do not care for cooked meals, preferring to handle their own food. In such cases, only good sleeping quarters are needed, with plenty of water and other sanitary arrangements, and a commissary where they can secure the necessary supplies.

To retain laborers after we do secure them is often easier said than done, and as long as other companies and individuals can offer better inducements than the railroads our men will leave us. With a perfectly clear knowledge of the cause of our shortage of men, our failure to take a firm stand in the matter, both in the men's behalf and our own, is to be deplored. The trouble is and has been that the importance of the track department is under-estimated, and no man comes to work in it who has any pride in himself or regard for those depending upon him because he will be looked down on by men in other branches of the service. The remedy is first, in the compensation we give our laborers and the manner in which we house and feed them; and second, in the treatment we and our foremen accord them and the opportunities offered for earning promotion. We should also furnish them motor cars to carry them to and from their work. All other mechanical tools consistent with the work should be used. As one of our most vital questions at this time, it should not be permitted to drop until relief is secured.

A. M. Clough (Chairman), supervisor New York Central, Batavia, N. Y.

DISCUSSION

The committee recommendation for uniform section forces throughout the year created much discussion. T. Hickey, Michigan Central, and D. O'Hern, Elgin, Joliet & Eastern, stated that much work such as gaging track and tightening bolts can be done satisfactorily during the winter keeping the men busy in constructive work. P. J. McAndrews, Chicago and North Western, pointed out the fact that the lengthening of the working season reduced the number of men required. The present practice of hiring men for a few months creates an abnormal demand during the summer, leading to excessive competition and abuses. He believes permanent forces are applicable to 80 per cent of the railway mileage. Coleman King, Long Island, described a plan in effect on his road for the last three years, whereby men are guaranteed permanent employment for the entire year and stated that over 90 per cent of the men now in service have been with the road over one year in spite of the present labor conditions. J. B. Oatman, Buffalo, Rochester & Pittsburgh, told of his inability to increase track forces appreciably above the winter basis, although authorized to put on many more men last spring.

The operation of boarding camps was also the subject of extended discussion. George Beckingham, Grand Trunk, strongly favored company operated labor bureaus and boarding camps, believing laborers would come to the company operated employment bureau first, and that more satisfactory results would be secured. Other members strongly condemned present conditions in boarding camps and urged that the companies take them over.

THE INSPECTION OF TIES IN TRACK FOR RENEWALS

1. To secure uniform practice and to prevent the removal of ties from track before their safe service life is exhausted and at the same time to distribute renewals properly in all tracks, ties for renewals should hereafter be marked by inspectors reporting directly to the supervising officers.

2. When the season arrives for the inspectors to start out, after conferring with their superior officers, they will inspect one mile of main track on each section in order to allow the section forces to begin tie renewals. They will then complete the inspection of all ties in main tracks and sidings on all sections. Inspectors will make a daily report to their superior officers on the proper form, showing the number of ties marked for renewals in the main track between each two mile posts and the number of cross-ties, switch ties and cross-over sets marked for renewals in each siding, giving the siding numbers.

3. Section foremen must in all cases accompany the inspector over their sections while the inspection is being made. For 1917 renewals one heavy white mark must be placed on the rail above each tie to be renewed, this mark to be placed on the west side of the west rail. Inspectors should keep a book record of all inspections, to be used from year to year for comparison.

4. There should be two standards for marking ties for renewals: (1) Where the track is not to be disturbed and (2) where the track is to be raised off the old bed. In the latter case, ties should be inserted while the track is being raised, thus placing them on the new bed. In the former case, ties should be dug in.

5. Inspectors should be provided with inspection picks, paint brushes and the necessary white lead paint.

6. Inspectors should be furnished with a statement showing the location of all track which is to be raised on each section, also the track where new steel is to be laid and re-ballasted.

7. Every tie which apparently is not good or which shows signs of decay or failure must be inspected with the pick.

8. In determining the necessity for replacing a tie, its condition as to decay and wear, the amount and character of the traffic carried, its position in track, the kind of timber, the condition of neighboring ties, the weight of rail and tie plates must all be considered.

9. Case 1—Ties should be inspected for the condition of timber by driving the pick into each side adjacent to the rail seats, near both the bottom and the top faces, below the sap line. The pick must be driven into the ties toward the center and must be drawn with as little prying as possible. Ties should not be tested on the top, with the exception of making tests for decay around tie plates and spikes. In making these tests, the ties should not be mutilated more than absolutely necessary. To test a tie for strength, one end of the pick should be inserted under the end of the tie and the pick used as a lever. If a tie is broken under the rail seat this method will usually determine it.

a. If two ties of only one year's safe service are together, one must be removed, and a group of ties of only one year's safe service, must be so removed as to leave each doubtful tie with one good neighbor.

b. Sap rot alone is not to condemn a tie for service.

c. A tie cut down by railwear is not to be removed unless the rail is cut into the face more than one inch. This applies to ties in tangents, as all ties should be full-plated and protected against rail wear on curves. On curvature where, through repeated rail renewals, ties are necessarily adzed more or less for the new plates, when a tie is so cut down as to weaken it for the service imposed, it should be removed and saved for side-track renewals if the timber is sound. On tangents where a good tie is cut down not more than one inch with rail wear or adzing, it should be protected against further cutting with tie plates.

d. In case ties are spaced too wide apart or where a large hewn tie is removed and replaced with a smaller tie, an extra spacer tie may be inserted, as the judgment of the inspector may decide.

e. Very careful attention must be given to the inspection of red oak and pin oak, also any other kind of timber that decays from the heart, as such ties usually rot from the center, leaving a hard shell, which can only be detected by careful inspection.

f. Where track is subject to heaving, and where shimming is necessary, care must be taken to insure enough good, sound timber for spiking and bracing, and careful attention must be given to the inspection of ties through road crossings, station platforms and other places where they are covered and liable to be overlooked by the section foremen.

10. Case 2—In track where new rail is to be laid or old rail is to be re-ballasted out of face, sufficient renewals should be made to last at least three years, depending upon the conditions, without being disturbed for renewals during that time. Inspectors will make a liberal inspection of such tracks, testing the ties for decay as in Case 1, but removing all ties that will not last more than three years. Where new steel is laid, no bad ties must be left under the joints. In making renewals in this case, some fairly good ties may be taken out, in which case they should be sorted and piled carefully, to be picked up and distributed for side-track renewals.

11. A lower standard of inspection should be used for mine lines and side tracks and especially for standing tracks in yards, where no tie must be taken out of track until its safe service life is exhausted.

12. In passing tracks care must be used to see that ties around turnout curves are in good condition.

13. In main tracks and sidings where the track is not to be lifted, foremen must renew only the ties that are spotted by the inspector, and in case they find ties which,

in their judgment, should be renewed, they will notify their superior officer and the inspector will be sent back to make a re-inspection. Where track is to be raised, the foremen should renew ties marked by the inspector and remove any unmarked ties which in their judgment should come out, such ties to be marked with a cross on the top face and laid aside for examination by the inspectors.

14. Inspection of ties by an independent inspector should not relieve the roadmasters, supervisors or foremen of the responsibility for the safety of their track.

15. Inspectors will inspect all switch ties in accordance with the above, except that in case a switch or cross-over set is more than one-half decayed, requiring renewals, a new set should be put in and any old ties taken out which are fit for use are to be saved and used for patching other sets.

16. After all tracks have been gone over and inspected, inspectors should spend their time checking renewals and marking ties which were missed by the first inspection. They should also carefully examine all ties taken out by foremen which were not marked originally and should see that all usable ties taken out of the track from any cause whatever are properly sorted and re-distributed for side-track renewals. Inspectors should give careful attention to all features of track work as they go over the line, especially in connection with tie renewals, and report promptly to their superior officer any defective practice coming to their attention, such as striking picks and other tools into new ties when drawing them into track, also adzing, spiking, tie-plating, etc.

DISCUSSION

D. O'Hern, Elgin, Joliet & Eastern, thought no further inspection was required than that given by roadmasters and foremen. He cited cases of incompetent inspectors that had been brought to his attention. Similar views were expressed by several others. J. B. Oatman said the track officers on his road were glad to have tie inspectors as these men saved them much time. The inspectors devote their entire time to this work, while the supervisors cannot give the necessary time and young foremen are frequently incompetent. J. F. Meir, New York, Ontario & Western, bore out this last point saying foremen would put in ties where it was easy or where little trucking was required. M. Donahue, Baltimore & Ohio, said it was his experience that roadmasters were glad to have the inspection done for them. He objected to the plan to inspect one mile of each section only on account of the time lost in riding to the next section. J. B. Kelley, Soo Line, favored inspectors as he believed the old system leads to much waste. Several others favored tie inspectors if under the direction of the roadmaster, while some preferred to have assistant roadmasters or shorter districts to permit the roadmaster to make the inspection. The report was adopted with minor revisions.

THE MATERIAL PROBLEM

By W. A. Summerhays,

Assistant Purchasing Agent, Illinois Central, Chicago.

The railroads are finding great difficulty, not only in maintaining their customary stocks of material, but in obtaining enough of the most necessary items to keep the road and equipment in safe operating condition. While deliveries have been greatly delayed, prices have climbed steadily. Track spikes that could be bought for \$3 a keg two years ago are now selling at \$8 a keg. During the same period track bolts have advanced from \$3.75 to \$11 a keg, angle bars from \$1.50 to \$3.25 a hundred weight, tie plates from \$36 to \$65 a ton, rail anchors from 16 cents to 31 cents each, steel rails from \$30 to \$40 a ton and other items proportionately. A very conservative estimate of the increases in prices of all items of material used in main-

tenance of way and structures places the figure at 30 per cent.

We have in our store departments complete records of each item of material in stock at the storehouses in addition to the quantities which are due on unfilled orders. On most railroads, however, it is the practice to carry small emergency stocks of track materials at designated points along the line as well as regular working stocks at each section foreman's toolhouse. In these times it becomes very necessary for each roadmaster and storekeeper to know exactly what is available at every point on the railroad. This is best accomplished by having for each division, whether in the office of division storekeeper or roadmaster, a complete tabulated list of every item of material on the division, showing its exact location. This statement should be kept up to date by adding each shipment of material received from the storehouse or supply car and deducting each item of material reported as used by the foremen. When emergencies arise requiring the immediate use of materials which can not be obtained readily through the customary sources, a record of this sort, showing the material on hand on the line of road is invaluable. The amount involved is no small matter, amounting to \$10,000 or more on any average operating division, and to \$20,000 or \$25,000 on the larger, busier railroads where rail, cross-tie and tie plate renewals are more frequent.

It is a natural tendency in maintaining line stocks of material to keep on hand more than the working conditions on the division justify. A record such as above described will show at a glance just how long each item has been on hand and whether it should be transferred to some other point where needed. No requisition should be passed to the purchasing agent until it has been checked carefully against the record of line stock as well as of storehouse stock and an effort made to supply the items needed from stock on hand.

Much of the material carried in line stock as a safeguard against possible emergencies remains on hand a long time before it is used. Unless given an occasional coating of heavy oil or thin paint the material soon becomes damaged by rust or action of the elements until it is little better than second-hand material.

It is extremely important to watch constantly the uses to which materials are put. Every dollar wasted in material means the expenditure of \$1.50 or \$2 to purchase the same quantity in replacement and nothing should be discarded until it is actually worn out.

While the prices of new material have advanced 30 per cent to 200 per cent, the price of scrap has risen to an even greater extent, and this has given rise on many railroads to a campaign toward cleaning up all scrap and putting it on the market. While it is desirable at all times to market all scrap as soon as it is available without permitting any accumulations, great care must be exercised to avoid selling as scrap a single item which can be put to further use. Even though the price of scrap is 300 or 400 per cent higher than at the start of the war, we must remember that the spread between scrap material and new material is much greater now than at that time.

Although all section foremen may be fully instructed relative to carefully inspecting scrap before loading for the market and holding out every usable article, it is a very human tendency to discard with the scrap all second-hand material of which the foreman has no immediate need. It, therefore, becomes necessary to have a competent inspector pass upon all scrap and set aside all material which is fit for further use or can be reworked. Where facilities are provided for reworking and assorting scrap at one point on a division or railroad system, a very decided saving can be effected by employing a blacksmith to rework certain materials.

All roadmasters are familiar with conditions in the rolling mills, due to giving preference to the government's requirements for new rail, the result being a decided shortage in new rails on many railroads. This condition has strongly affected the supply of frogs, switches and guard rails owing to inability of the frog manufacturers to procure new rail. Every roadmaster can help this situation by making careful inspection of every piece of track material removed from track. Many spring frogs and bolted rigid frogs can be made fit for further use, when removed from track because of having only one part broken, by removing a similar part from another scrap frog and making repairs. A great deal of this kind of work is being accomplished on various railroads, some railroads going to the expense of fitting up small shops where second-hand rail can be planed and fitted to supply the needed parts in repairing frogs. In view of the wide spread between the cost of new material and the value of scrap material, the present is an exceptionally favorable time for installing a plant of this nature.

DISCUSSION

P. J. McAndrews, Chicago & North Western, described in detail the methods used on the North Western to repair frogs in side tracks and yards by means of the oxygen acetylene welding process. The road has 50 outfits and plans to provide each roadmaster with one. The process has not been used on the main tracks but he believed it is practicable. The outfits are leased to the railroads by a manufacturer who sells the gases and metal used in welding, and also furnishes an instructor to teach the process. Bright young men taken from section gangs learn to do the work very quickly. The torches are also used for cutting rails and burning bolt holes as accurately as necessary for side track work. Old angle bars have been welded to part of the rail for rail anchors when new anchors could not be obtained.

THE ECONOMY OF OILING TRACK FASTENINGS

By E. T. Howson

Engineering Editor, the *Railway Age Gazette*

To have suggested that track fastenings should be oiled to protect them from corrosion would have subjected one to much ridicule only a few years ago. Yet today not one, but several large roads have made this a standard practice and others are awakening rapidly to the economy of this procedure, so that it is now a subject of live interest to track men.

THE DESTRUCTIVE EFFECTS OF CORROSION

The destructive agents attacking track materials may be divided into two general groups, (1) those resulting from wear created by service and (2) those resulting from atmospheric and other agencies producing corrosion. It is with the latter group that we are interested here. Corrosion is induced primarily by (1) the action of the atmosphere, (2) the action of salt water or spray on lines located along the seacoast, (3) by local conditions at tunnels, etc., and (4) by brine drippings from refrigerator cars.

Atmospheric corrosion is present everywhere, although in widely varying degree of activity. Its effects are most pronounced in humid climates, as in certain parts of the south, while its action is almost negligible in parts of the arid west. The most severe corrosion exists on those railroads over which large numbers of refrigerator cars are hauled.

The first effect of corrosion is a loss of material. This may be so small relative to the total area of the section as to be negligible, but with track fastenings this deterioration frequently continues to the extent that failure is brought about from weakness due to loss of section. One of the most severe examples of brine corrosion in this country is found on the tracks of the Chicago Junction Railway in

the Union Stock Yards, Chicago. On one of the main switching leads over which refrigerator cars are moving almost constantly the base of the rails, the tie plates and the fastenings are eaten away so quickly that they have to be renewed at intervals of not to exceed one year. This condition is more severe than that found on the average road. However, severe conditions are found frequently on lines out in the open. They are brought about primarily by the brine, but the atmospheric corrosion tends to the same result.

Another common and serious result of corrosion is the rusting of the nuts in place on track bolts. This condition prevents their being tightened readily, as they should be from time to time, and causes a heavy breakage and consequent loss of bolts when they are tightened. When relaying rail, the presence of corroded bolts not only slows down operations through the necessity of cutting them off, but this operation in itself is expensive.

APPLYING OIL ARRESTS CORROSION

The realization of the losses in track materials brought about by corrosion has led to the experimental application of oil on a number of roads during the last few years. To be effective in arresting corrosion, it is important that the proper grade of oil be selected. It must not be so thin that it will not remain on the fastenings, but will run off freely onto the ties and ballast, while it should not be so thick that it will not distribute itself over the metal readily. Where the proper grade of oil is secured it has been found possible to retain this coating on the fastenings for a year or more.

When experimenting in a limited way it has been the common practice to apply the oil by hand, giving a track walker or section man a bucket of oil and a small broom, brush or swab. This was the method used by the Chicago & North Western in oiling the joints on six miles of track in which new rail was being laid last year. Ordinarily crude oil was used for this work at a cost of about \$4 per single-track mile, 50 cents of which was for material and \$3.50 for labor.

The Union Pacific oiled the joints in one mile of track in each roadmaster's district on the Wyoming district last fall. The bolts were not tightened for two or three days after the oil had been applied, but after that interval it was found that they were tightened more easily and that the threads on the bolts and nuts were maintained in better condition, thereby securing a saving in both labor and material. To secure a direct comparison of results a number of joints which had been oiled and a similar number which had not been so treated were removed recently for examination, and it was found that while the bolts which had not been oiled showed evidence of corrosion and cutting of the threads, the others showed no such tendency.

The Chicago, Burlington & Quincy adopted the practice a year ago of oiling all the joints and bolts when laying new rail or when relaying second-hand 85-lb. rail or heavier on main lines. Bolts in main tracks which are to be relaid are also oiled about a month in advance of the removal of the rail and this practice has been found to permit a much larger percentage of the bolts to be reclaimed. Recent studies of this subject have also led to the decision to oil not only the joints, but also the base of the rail and other fastenings on certain lines of this road.

A little over two years ago the Illinois Central began to experiment with the oiling of track fastening on its Southern lines, the results of which have been so satisfactory that it has been extended over the entire system and all joints are now oiled twice a year. The oil is ordinarily applied by hand with an ordinary whitewash or paint brush. Approximately 10 gal. of low-grade fuel oil is required per mile. The total cost of this application

varies from \$2.50 to \$4.25 per mile, averaging somewhat over \$3.

One of the earliest roads to undertake the oiling of track fastenings was the Atchison, Topeka & Santa Fe, on which road it has been found that this practice has increased the life of the bolts 25 per cent. Careful records have also shown a saving of over 30 per cent in the number of bolts required for replacement purposes on the Eastern lines, while it has been estimated that the amount of labor required to tighten loose bolts has been reduced at least 40 per cent. About 75 gal. of fuel oil, costing about 5 cents per gallon, is required per mile, making a total cost for material of \$3.75 per mile and \$2.50 for labor. Where the bolts and joints are oiled alone the total cost is approximately \$2.50 per single-track mile.

THE LACKAWANNA HAS DEVELOPED AN OILING MACHINE

The Delaware, Lackawanna & Western has developed this practice further than any other road. This line has been a pioneer in the development of heavy track construction. Creosoted ties and screw spikes are used exclusively, while the tie plates are of a heavier section than commonly employed elsewhere. With treated ties costing \$1.30 each, tie plates between 30 cents and 50 cents, screw spikes 5 cents and track bolts from 5 to 11 cents each, and other track materials correspondingly expensive, this road began an investigation of means of protecting these materials early, which led to the oiling of track fastenings. Further study led to the development of a track-spraying device in 1914. The following year a flat car was equipped to distribute the oil and in 1916 an enclosed air-operated car was built in a remodeled caboose. One end was rebuilt to bring the operating table as far forward as possible and the car was equipped with air compressors, air supply tanks, sand boxes, rail wiper, oil strainer, air-operated oiling devices, an automatic device for clearing obstructions on the track and adjustable circular nozzles. The car was also equipped with a headlight, whistle, air brakes, speedometer and pressure gages, enabling the operator to control the train and to know the conditions under which he was working at all times.

Approximately 1,100 miles of track was oiled with this machine in the fall of 1916 at a cost of \$5.60 per mile, divided as follows:

10,400 gallons of oil at 5 cents.....	\$520
Engine and crew.....	30
Operator	5
Materials and supplies.....	5
Total cost per day.....	\$560

When the oil was first applied, in 1915, it was expected that it would loosen and remove the scale and corrosion on the rails and fastenings and a heavy application was made where corrosion from brine drippings or other causes was severe, the ordinary application being about 100 gal. per mile. The following year it was found that the oil had removed the heavy scale and exposed the solid metal where the corrosion had been severe and at other places subjected to ordinary attacks the oil was in first-class condition on the fastenings. After making a further application last year it is evident that this oil is now protecting the rails and fastenings satisfactorily. With the dust created by traffic it has formed a coat on the metal that is not affected by weather conditions. Based upon this experience, it is believed that a heavy coating of oil after the original application may be followed by lighter applications once a year where track is not subjected to excessive severe corrosion.

The practice of oiling track fastenings to protect them against corrosion has now been developed satisfactorily to demonstrate the fact that oil of the proper grade will protect the rails and fastenings from corrosion and thereby

extend their life materially. The economy of the oiling of the fastenings would appear to require no demonstration, particularly at the present time, when these materials are obtainable only with great difficulty and long delays.

DISCUSSION

C. H. Gruver, Chicago, Rock Island & Pacific, stated that on his road all joints were oiled twice a year and he finds the practice successful. It is done with a pail and brush and costs \$12 per section. J. H. Brown, Atchison, Topeka & Santa Fe, told of six years' experience with oil and stated that it was entirely successful. It eliminates rust and makes wrenching easy. Cattle guards are also oiled, thus greatly increasing their life.

LABOR SAVING EQUIPMENT FOR TRACK WORK

By E. J. Boland

Roadmaster, Illinois Central, Freeport, Ill.

It is the intention here to give an idea of the labor-saving devices in use on one of the large railroad systems of this country. There are two reasons for the installation of this large amount of the equipment mentioned below, (1) as a matter of progress, and (2) to offset the growing scarcity of all classes of labor.

Ditchers. The steam ditcher is one of the greatest labor savers in operation today. The company now has nine ditchers of the boom type. The saving with the operation of these machines is estimated at 10 cents per yard on 250 yd. per day over the next best method. Six months' operation per year will save about 50 per cent on the investment. In addition to operating as ditchers, these machines can be used in loading and unloading all kinds of materials, for other heavy lifting and for excavating work.

Dump Cars. Air dump cars in place of flat cars in dumper service are of great value. The method is to operate two 20-yd. air dump cars with each dumper, one ahead of the machine and one behind. By this method the cars are easily loaded and can be unloaded immediately. My experience has been that a saving of four cents per cubic yard can be made, based on 125 cu. yd. per day, which figures about 22 per cent on the investment, based on six months' operation per year. This also releases the 10 or 12 steel underframe flat cars for revenue service and the Lidgerwood for heavier work in unloading gravel ballast.

Lidgerwood Unloaders. The company now has 11 of these machines which are used in unloading gravel ballast, sand for track elevation, dirt, strippings for banking and any similar heavy work which is found necessary. A trainload of gravel from the Foreston, Ill., pit consisting of 35 Haskell & Barker cars of about 30 yd. each can be unloaded with one of these machines in about 30 min. provided the material is unloaded continuously. This operation would require 210 men for about 2½ hours without this equipment. These machines, when operated six months of the year, will save at least 50 per cent on the investment.

Track Supervisors' Motor Cars. The company has provided each roadmaster and track supervisor with an inspection car, which has increased the efficiency of these officers over 100 per cent. The track can be given much closer attention than by any other method.

Section Motor Cars. Until recently the company had only a few sections equipped with cars of company ownership. A great number of the men had realized the advantages that could be obtained from motor cars and had purchased engines themselves from various makers which were installed on their hand cars. The road has now purchased a sufficient number of cars to equip all of the gangs. Arrangements were also made to purchase the engines from the foremen, so that the company would be the sole owner of all of the motor-car equipment on its lines.

Bridge, Building and Extra Gang Motor Cars. The additional advantage obtained in this class of work is that the gangs often travel long distances. The men are carried to their work with the greatest despatch and are not worn out by the trip. It is not necessary to move the camp outfits nearly so often, which saves car mileage and switching.

Motor-Car Mowing Machines. After trying out a machine of this character for two years it was found so desirable that 13 more were purchased. These cars will mow a neat swath on each side of the track at the rate of about 30 miles per day. Each machine will save its cost every year.

Tracklaying Machines. The nine tracklaying machines which are now operated by the company have been of great service in offsetting the labor situation. They are a great relief to the men, as the machine does all of the heavy lifting. The gangs can be reduced or more rail laid than was possible with the same gang prior to operating the machine. The ordinary new rail program on this road includes between 50,000 and 60,000 tons per year and any reduction in the cost of laying this rail cuts down one of the largest items of expense.

Rail Loaders. Each division is now equipped with an approved air rail loader which can be operated with three or four men, whereas this work formerly required about 20. A saving of this kind is an absolute elimination of all of the useless work which was formerly done by hand.

Tool Grinders. This device relieved the most cumbersome tool that was carried on the hand or motor car. Grinders cost from \$12 to \$25, depending on the number of attachments provided with the machine. Tools can be kept in better shape and the machine saves its first cost in one season.

Weed Burners. These are of great value in the heavy semi-tropical country. These machines when operated over a district a second time, destroy all growth for a width of 18 ft. for an entire season. The labor of operating is almost nothing, compared with hand work in the same locality.

Rail Saws. The company is now operating one portable rail saw at Clinton, Ill., and authority has been granted for an elaborate permanent sawing plant to be located at Centralia. All second-hand No. 1 rail of the 85- and 90-lb. class is sawed and re-drilled before relaying in branch-line main track. The sawing process makes infinitely better riding track and adds greatly to the life of second-hand rail. It is figured that about \$2 per ton will take care of all of the expense of handling and sawing. The riding of track has improved 100 per cent by using sawed rail, in comparison with the old method.

Snow-Thawing Outfits. The greatest advantage in these outfits is that it is not necessary to reload snow and ice taken from switches and interlocking plants. In congested territory it was formerly necessary to cast snow out of the switches and in some cases it would have to be handled five or six times before it was finally disposed of. One man with one of these outfits can accomplish as much as three or four by the old method.

Cinder Cars. Each terminal should have a sufficient number of cinder cars to take care of all of the cinders handled without using cars in revenue service. The side dump car with the ridge bottom is the best class of car in service. It is proposed, however, to make these cars large enough to hold 50 tons of cinders, which would cut down the number of cars and greatly aid in the distribution.

There are many other small devices which are of great advantage to the trackman, some of which are—

Lawn movers,
Switch-point straighteners,
Portable electric timber drills,
Oxweld repair outfits,

Ballast screening outfits,
Rail benders,
Snow plows and flangers,
Electric trucks (for service in shipyards and docks),
Cleaners for bridge steel (no satisfactory device is on the market at the present time, but a device for cleaning bridge steel preparatory to painting would be a labor- and money-saving device).

Tie sizing and boring machines,
Acid grass and weed killers (several of these patent weed killers have been tried out on this system, but the results obtained have not been satisfactory enough for the expense incurred to justify their use). I think that every device of this kind should be given fair trial, as the labor to remove weeds and grass by hand is tremendous.

INSPECTION OF RAILS AT THE MILL

By C. W. Gennert, Jr.,

Manager, Rail Inspection Department, Robert W. Hunt & Co.,
Chicago.

It is said that the earliest inspection of rails consisted chiefly of determining whether the size of the flaws in the flanges of the iron rails would permit of their concealment by dovetailing into them a piece of iron and afterward rubbing the patch with a mixture of scale and white lead. Later at the commencement of manufacturing Bessemer steel rails, which railroad officers were reluctant to adopt on account of their supposed brittleness, inspection became a more serious matter. Somewhat stringent specifications were required to be followed, and eventually chemists were employed to analyze the steel made. The new order of things came to stay, and manufacturers, as well as railroad officers, were brought to a keen realization of the fact that with so important a subject as rails, their careful and systematic inspection was not only warranted, but positively necessary.

STARTED IN 1912

It seems remarkable that for years the inspection consisted, apart from chemical and physical testing of the steel used, of merely examining the exterior or surface of the rails rolled; that is, (1) of insuring the proper fit of the template or gages; (2) of guarding against the shipment of rails containing flaws, seams and similar defects that can be seen on the surface, and (3) of assuring adherence to the desired mechanical finish of the rails with regard especially to the lengths, squareness of the ends, drilling of the bolt holes, etc. The idea never seemed to occur that steelmaking and the subsequent treatment that steel receives from the time it is made until it is finally rolled into rails is subject to all of the frailties to which either the misworking of the process or error of the human agency may contribute. But in 1912, when a very severe winter's record of rail failures had brought this subject to foremost attention, it was deemed advisable, by certain railroads, to inaugurate a system of greater or closer rail inspection. It is a system of inspection now recognized as essential by over 60 per cent of the railroad mileage of the United States and Canada.

Two important facts in connection with the manufacture of rails must be remembered; first, that all of the work is continuous for 24 hours a day and 6 days a week; and second, that the workmen are invariably paid on a tonnage basis, say, for 100 tons, with a bonus when this amount is exceeded in a stated time. Both of these conditions are almost a positive essential to the industry, as obviously and under most circumstances an increase of production must be invited from the men. But no other conditions possible could probably introduce the liability for error, or the exercise of poor judgment that might result in bad quality that these do, for the temptation among the workmen to

"speed up" some part of the process unnecessarily becomes quite irresistible at times and possibly to the detriment of the quality of the rails being made.

Special inspection provides a safeguard for the evils associated with the process of making rails. The system contemplates the employment of inspectors for duty day and night in each important department of the mill. These inspectors, employed in so far as possible because of their experience with the work of the department to which they are assigned, act as monitors in that department. Each man keeps an individual record of the work of his department, so made up that it is actually a historical record of each heat of steel made and the treatment it later receives in the rolling process. The men are instructed not to interfere with the operation of the mills in any way except by appealing to the moral responsibilities and obligations of those in charge. This they do by first reporting verbally to the foreman in charge of the work in each department any deviation from recognized good practice, and then by confirming that report in writing to the higher officers in charge. Immediate opportunity is therefore afforded the manufacturer to divert the metal affected by bad practice or workmanship to other uses or orders, and to take such action as will prevent shipment of the rails which might otherwise go forward. This feature alone has resulted in the greatest check imaginable on errors of mill practice and lack of judgment due to the employment of workmen on the tonnage basis. The workmen apparently realize that an inspector is watching every move with the interest of the final purchaser of the rails so much at heart that any evident carelessness or lack of good judgment may be promptly reported to the officers and consequent disciplining result. And this also has been the principal feature of special inspection that has so largely appealed to the officers of the manufacturing companies, for they, unquestionably desiring to make and ship only rails of the best quality and workmanship possible, have been quick to appreciate the advantage gained.

The reports of the special inspectors are accumulated eventually and made up to comprise a complete record of each heat rolled and this is furnished to the purchaser as desired. A splendid opportunity is thus afforded for keeping definite record of the data concerning the manufacture of each heat of rails and the later serviceability of those rails; in fact, a plan has been advanced whereby the linking together of the manufacturing record with the failed rail records might afford untold benefits in the solving of the ultimate problem of what constitutes good rails, but unfortunately this plan has not yet been taken advantage of except in isolated cases.

There is one remaining feature connected with the manufacture and inspection of rails which it seems not only fair to mention, but to impress you with it to the fullest extent. It is this: The best steel rails possible of making and the closest and most critical inspection will be of no avail whatsoever unless the rails are properly used by the railroads. You appreciate fully that the slightest nick in the right place can ruin the best of steel and its misuse in other ways frequently proves equally injurious.

OTHER PAPERS

C. J. Coon, engineer of track, Grand Central Terminal, New York, read a paper Wednesday morning on maintenance of track in large terminals in which he discussed track construction and maintenance methods applicable to intensive operation under adverse conditions.

J. S. Robinson, division engineer, Chicago & North Western, Chicago, read a paper on housing and feeding maintenance employees in which he described a design of portable frame house which could be built economically and also be dismantled readily and moved from place to place.

Coleman King, Long Island, presented a paper at the Tuesday evening session describing in detail the work involved in assembling materials and building tracks at the cantonments on Long Island.

The annual dinner of the Track Supply Association was held at the Auditorium Hotel Wednesday evening. There were 300 members and guests present. M. J. Gormley, assistant to the president, Chicago & North Western, and chief general agent of the central district of the American Railway Association at Chicago, spoke on the transportation problems incident to the war.

The report of the secretary showed 102 new members and a total membership of 964. The treasurer reported over \$1,300 in the treasury. The total registration of members at the convention was over 250.

On Thursday afternoon the party visited the Gary mill of the Illinois Steel Company, studying the manufacture of rails.

THE TRACK SUPPLY ASSOCIATION

The sixth annual exhibit of the Track Supply Association was held in a room adjoining the convention hall. About 50 firms exhibited their devices. Most of these had exhibited before, but there were also several new ones. The officers of the association for the past year were: President, R. A. Van Houten, Sellers Manufacturing Co., Chicago; vice-president, E. T. Howson, *Railway Age Gazette*, Chicago; secretary-treasurer, W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y.; past-president, F. A. Preston, The P. & M. Company, Chicago; director, J. J. Cozzens, Union Switch & Signal Company, New York, N. Y.; director, F. A. Barbey, Frictionless Rail, Boston, Mass. The names of the exhibitors, together with the products exhibited and the names of representatives in attendance follows:

Ajax Rail Anchor Co., Chicago. Rail anchors. H. G. Elfborg, G. N. Holmberg, A. W. Holmberg.

American Hoist & Derrick Co., St. Paul, Minn. American railway dumper. Edward Coleman, H. O. Washburn.

American Steel & Wire Co., Chicago. American steel fence posts, American fence. M. E. Evans, A. W. Froude, J. Alexander, L. P. Shanahan, J. Collins, C. Boone, B. Ryder.

American Valve & Meter Co., Cincinnati, Ohio. Economy switch stand, Anderson interlocker switch stand, Safety switch lock. J. T. McGarry, F. C. Anderson.

Anti-Creeper Corporation, New York. Rail anchors. O. Metcalf, C. H. Genscher, T. J. B. Bowman, E. L. Mills, P. B. Brown, A. J. Dinklage, E. T. Evans.

Barrett Co., New York. Tarvia, Barrett's shingle stain, Corbosota grade one liquid creosote oil, semaphore roofing, Multi-shingles, Everjet paint. E. J. Caldwell, J. R. McVay, John Ross, H. W. Fleming, Tom A. Warton, K. C. Barth, C. F. Ames.

Bethlehem Steel Co., South Bethlehem, Pa. New Century adjustable switch stand and "Steelton" positive switch stand. Robert E. Belknap, Neil E. Salsich, John F. Hennessy.

Carbic Mfg. Co., Duluth, Minn. Carbic lights. Gordon Paterson, H. N. Haberstroh.

Chicago Malleable Castings Co., Chicago. Thomas rail anchor tie plate. J. S. Llewellyn, W. M. Osborn, Ralph Schmidt.

Crerer, Adams & Co., Chicago. Calumet track drill, Ureka bonding drill, Carbic lights, track jacks, journal jacks, car jacks and Calumet die starters. Russell Wallace, W. I. Clock, George Bassett, J. A. Martin, C. Clifford, C. Gregory, R. Bullard.

Duff Mfg. Co., Pittsburgh, Pa. Genuine Barrett track jacks, Duff standard and high speed ball bearings, screw jacks and journal jacks. C. M. Thulin, E. J. Johnson.

Fairbanks, Morse & Co., Chicago. No. 36 one-man inspection motor car. A. A. Taylor, E. C. Golladay, D. K. Lee, G. W. Lewis.

Fairmont Gas Engine & Railway Motor Car Co., Fairmont, Minn. Motor cars. D. G. Shephard.

The Frictionless Rail, Boston. Special section of rail for track curves. F. A. Barney, B. W. Simmonds, T. F. Dwyer, Jr.

Hauck Manufacturing Company, Brooklyn, N. Y. Thawing outfits, kerosene burning torches. G. A. Nelson, W. C. Squires, C. P. Cogswell.

Hayes Track Appliance Co., Richmond, Ind. Hayes derails. S. W. Hayes, R. W. Slatterback.

R. W. Hunt & Co., engineers, Chicago. Inspection of materials. C. W. Gennet, Jr., J. J. Clark.

Indianapolis Brush & Broom Co., Indianapolis, Ind. Track brooms. F. R. Lay, George Lemaux.

Indianapolis Switch & Frog Co., Springfield, Ohio. Electric welder and manganese track worker. J. C. Jameson.

Ingersoll Rand Co., New York. Pneumatic tools and tie tampers. W. H. Armstrug, W. J. Warner, C. Dougherty.

Lackawanna Steel Co., Buffalo, N. Y. Hook shoulder tie plates, grooved head angle bars, Abbott rail joint plate, welded high T-rail joint. A. P. Van Schaick, J. Hench, F. E. Abbott, A. H. Weston.

Alexander Milburn & Co., Baltimore, Md. Milburn carbide light and oxy-acetylene welding and cutting apparatus. E. C. McNutt.

Madden Company, Chicago. Track labor saving devices. H. C. Holloway, T. D. Crowley.
Mudge & Co., Chicago. Motor cars. R. G. Sinclair, F. Posson, George W. Bender.

National Lock Washer Co., Newark, N. J. Nut locks. J. Howard Horn, R. L. Carncross, John T. Patterson, Alvin T. Thompson.

National Malleable Castings Company, Cleveland, Ohio. Rail anchors, rail braces and tie plates. J. J. Byers and T. W. Ashton.

Oxweld Railroad Service Company, Chicago. Welding by its oxygen and acetylene system. George Thompson, E. A. Woodworth, L. C. Ryan.

P. & M. Co., Chicago. P. & M. Vaughn and Henggi rail anchors. F. A. Preston, John Reagan, L. O. Henggi, John E. Mahoney, S. M. Clancy, Alvar R. Sutter, P. B. Samuelson.

Pocket List of Railroad Officials, New York. C. L. Dinsmore, J. Alexander Brown.

Q. & C. Co., New York. Rail clamps, derails, rail and step joints. J. L. Terry, R. B. Quincy, C. M. Brennan, A. R. Horn, A. Robertson.

Rail Joint Co., New York. Webber, Continuous, Troy, plain, insulated and step joints. B. C. Armstrong, G. H. Larson, A. C. Chapman, E. F. Schermerhorn, W. S. Boyce, G. T. Willard, I. N. Towne, H. C. Hickey, C. B. Griffin, J. P. Norton, Charles Jenkinson.

Railroad Supply Co., Chicago. Tie plate. H. H. Smith, H. C. Van Nstrand.

Railway Review. W. M. Camp, Elmer Gougeon, H. A. Smith.

Ramapo Iron Works, Hillburn, N. Y. Solid-rolled double-shoulder switch plates, Automatic safety switch stand. W. C. Kidd, Arthur Gemunder, Thomas E. Akers, Douglas E. Snow.

Reading Specialties Co., Reading, Pa. Rail bender, guard rail clamp, Compromise joint car replacer and fastener, tie spacer and Reversible rail bender. B. John Buell, J. J. O'Connell.

Henry Roos Foundry Co., Chicago. Hardick locked and covered turnbuckle, Boltless Head Rod. William Hardick, L. A. Ogden.

Sellers Mfg. Co., Chicago. Tie plates. J. M. Sellers, R. A. Van Houten, G. M. Hogan.

Simmons-Boardman Publishing Co., New York and Chicago. E. T. Howson, W. S. Lacher, J. H. Cross, H. A. Beardsley, J. H. Bryan.

Simple Gas Engine Co., Menasha, Wis. Gas engines. John P. Hrubesky, F. J. Oberweiser and John G. Walter.

Southern Railway Supply & Equipment Co., St. Louis, Mo. Saunders car stocker. W. D. Achuff, L. Boswell.

Templeton-Kenly & Co., Ltd., Chicago. Simplex jacks. A. C. Mills, J. H. Hummel, W. B. Templeton.

Track Specialties Co., New York. Superior mechanically operated derailler, Superior hand operated derailler, Trasco guard rail clamp, Superior compromise rail joint, Superior rail bender, Superior rail joint, Trasco guard rail brace, Trasco tie plate, Trasco padded tie plate, Trasco rail brace, Trasco foot guard, Trasco slide plate and brace. J. H. Bodkin.

Union Switch & Signal Co., Swissvale, Pa. Keystone insulated rail joint. J. Roett, J. J. Cozzens.

Vernon Tool Works, Pittsburgh, Pa. Track tools, gages, levels. H. C. Mull, E. Woodings, H. Fischer.

Walls Frogless Switch & Mfg. Co., Kansas City, Mo. Electric operated frogless switch. C. E. Ennis, C. M. Walker.

Wyoming Shovel Works, Wyoming, Pa. Chrome nickel steel, heat treated track shovels. H. T. Potter, G. E. Geer, H. C. Emery.

At the annual election of the Track Supply Association held Wednesday morning, the following officers were selected: President, E. T. Howson, *Railway Age Gazette*, Chicago; vice-president, J. J. Cozzens, Union Switch & Signal Company, New York; secretary-treasurer, W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y.; directors, F. A. Darbey, Frictionless Rail Company, Boston; E. Coleman, American Hoist & Derrick Company, St. Paul, Minn.

PROGRESS OF THE ERECTION OF THE QUEBEC BRIDGE

QUEBEC, September 19, 1917.

With favorable weather conditions obtaining it now seems assured that the work of hoisting the central span of the Quebec bridge to its final elevation, one hundred and fifty feet above the level of the St. Lawrence river, will be completed before sun-down Thursday, September 20. The hoisting was begun on Monday, September 17, and at quitting time, 6. P. M. Wednesday, the span had been raised through one hundred and twenty feet of elevation, leaving only thirty feet to be negotiated before it reaches its final level.

The preliminary work having been completed previously it was intended originally to float the span to place on Saturday, September 15, but because of the unfavorable weather conditions action was deferred till Monday.

On Sunday night the conditions were considered favorable and the valves controlling the flow of the water in and out of the scows on which the span had been supported for some time were closed after the lowering tide had completely drained the scows of water; and with the rising tide of Monday morning the scows floated clear of their specially pre-

pared foundations and the three-mile towing trip to the site of the bridge was begun. The trip from the erection site to the site of the bridge consumed about two hours. Arriving at the bridge site the span was made fast and held in its proper position under the cantilever arms of the main structure by means of cables. The hanger lifting chains by which the span was raised were then attached to the supporting girders and the hoisting operations were begun shortly after 10 o'clock.

The hoisting is being done by eight hydraulic jacks placed two at each corner of the span and for each cycle of the jacks the lift is two feet. The work on Monday, which consisted of twelve lifts or twenty-four feet of elevation, was accomplished without a hitch.

On Tuesday when twenty-two lifts were made the work was held up for three hours in the early afternoon by the breaking of a bracket used in connection with the removal of the raised links of the hoisting chains. While this accident was minor it was necessary to hold up the work while a new bracket was made and installed.

On Wednesday before commencing the hoisting operations the brackets around all the chains were reinforced but in spite of this delay twenty-six lifts were made during the day.

RAILWAY SIGNAL ASSOCIATION

The Railway Signal Association held its twenty-second annual meeting at Atlantic City, N. J., on September 18 and 19, with about 100 members in attendance and President C. A. Dunham (G. N.), in the chair. The president, in his opening address referred to the stress of war conditions as affecting the signal departments of the railways and urged adherence to high standards in spite of the varied difficulties. Numbers of members have joined the army or the navy and the speaker uttered a patriotic Godspeed to them. The association looks forward to their safe return and keeps their names on the rolls of membership with all dues suspended. The work of the committees was commended and a warm tribute paid to the excellence of the work of the former committee which framed the present constitution of the association.

Secretary C. C. Rosenberg reported a membership on August 31 of 1,281, a net increase in 12 months of 13. He is unable to learn the names of all who have entered the military service and requests all interested to advise him of all such names. The 1,281 members include 703 senior, 226 junior and 344 associate, and representative votes (801) are cast by 70 railroads, operating about 173,000 miles of road and 186,000 signal blades. Receipts of the association for the year were: Balance, \$2,453; dues, \$3,469; sales of literature, \$3,536; miscellaneous, \$3,730; total, \$13,188. Expenses, printing, journal, etc., \$4,409; running expenses, \$5,774; balance, \$3,005.

The first report was that of the Harmonizing Committee, H. S. Balliet (N. Y. C.), chairman. This committee has reviewed all specifications adopted up to 1917 and all recent action taken by the association and submitted reports on 20 subjects. Some of these reports had not been concurred in by the committees most interested and there was a long discussion on the true functions of a harmonizing committee. The great bulk of the work of the committee was accepted, but the meeting buckled down to about three hours of committee work and directed that a number of subjects be referred back to the primary committees, mainly Committee No. 2, Mechanical Interlocking and No. 6, Standards.

Committee No. 3, F. B. Wiegand (N. Y. C.), chairman, presented a revised specification for petroleum asphaltum for protecting insulated wire in trunking, which after some amplification was adopted to be referred to letter ballot.

Committee No. 2, C. J. Kelloway (A. C. L.), chairman, presented a report on Field Construction of Pipe Lines, which

after brief discussion was accepted and ordered sent to letter ballot. A report by the same committee on Locking Switches Mechanically at Interlocking Plants was discussed at considerable length, the question whether the lugs for No. 1 switch rods should or should not have slotted holes developing decided differences of opinion. With first class road bed and large rails they are not used; but many members declared them a necessity. After a long discussion the report was accepted, not as a standard but in the nature of instructions to the Committee on Standards (Committee No. 6).

The Committee on Standards (No. 6), F. P. Patenall (B. & O.), chairman, presented eleven new designs and 15 revisions of designs, and a specification for lantern globes. These designs include the following:

Details and Assembly of Multiple Unit Bolt Lock; Mechanical Semaphore Bearing; Operating Connections for Mechanical Signals; Guide Clamps for Vertical Connections on Signals; Deflecting Bars; Cable Post Pinnacle and Cable Outlet; Relay Boxes; Cable Posts and Relay Boxes; Relay Box Inlet Bracket; Relay Box Linings and Terminal Boards; Horizontal Adjustable Deflecting Stands; Vertical Deflecting Stands, and Detector Bars. Also a revised compensation table and five pages of signal symbols, revised.

Also, two drawings, submitted for discussion only, covered an assembly of switch fittings for a double slip switch, and the same for movable point frogs. These represent designs already in satisfactory use on two roads. All of the foregoing, after some discussion, were accepted, and ordered sent to letter ballot, excluding the last two, but including the specifications for hand lantern globes. The matter concerning photometric tests of globes was criticized as incorrect in some details and was accepted subject to correction.

In line with an instruction to look into the specifications for signal roundels, lenses and glass slides, with a view to considering the high transmission convex glass, the committee made numerous field tests and visited various glass companies, with the result that it considers it advisable to adopt the high transmission, convex glass. This will give an increase in efficiency in the transmission of light. The convex roundel is to be recommended on account of its greater strength, eliminating to a certain extent the possibility of snow collecting on the face of the roundel and the absolute elimination of phantom lights. It was found that there are in use 16 different diameters in red roundels, 12 in yellow roundels, 17 in green roundels, 7 in purple roundels and 7 in blue roundels. The committee recommended the confining of new designs of apparatus requiring roundels to $8\frac{3}{8}$ in. and $5\frac{3}{8}$ in. in diameter for all colors.

In lenses, the committee found 9 diameters in red reported in use, 5 in purple, 6 in green, 4 in lunar white, 7 in white flint, 4 radius lenses, or a total of 40 different diameters in the various colors. The committee recommended the confining of new designs to the following in order to reduce the stock of various diameters: 4 in., $4\frac{1}{2}$ in., 5 in., $5\frac{3}{8}$ in., $6\frac{1}{8}$ in., $8\frac{3}{8}$ in., 10 in. and 10 in. doublet lens.

In the discussion on glasses the recommendations of the committee were warmly commended. It was suggested by a glass maker that the maintenance-of-way and the motive-power departments also should be brought into the movement to reduce the great variety of sizes. A. H. Rudd (Penn.), uses convex roundels of high transmission glass with great satisfaction.

Committee No. 10, R. B. Elsworth, (N. Y. C.) chairman, presented a specification for lead type stationary storage battery; general specifications for switchboards, including requisites, and a drawing of a proposed standard thermometer for storage battery. The committee brought up to date the specification for the battery now in the manual in order to harmonize the subject-matter wherever possible with specifications of similar character adopted in 1916. The switchboard specifications had been thoroughly gone over at a joint

manufacturers' meeting. The thermometer can be purchased economically in the open market.

The whole report was accepted and referred to letter ballot; but the switchboard specification was discussed at considerable length. There was a demand that all matter in the specification be written out in full instead of referring, as is done in some cases, to the specifications of the American Institute of Electrical Engineers; but this A. I. E. E. manual was said to be procurable at 25 cents a copy and the meeting sustained the present practice.

Committee No. 8 made a long report (presented by W. W. Morrison) 40 pages of which were filled with descriptions of alternating current signaling on 15 roads (including several electrically operated lines) as follows: The Philadelphia & Reading, the Cleveland, Southwestern & Columbus, the Norfolk & Western, the Boston Elevated, the New York, New Haven & Hartford, the Chicago, Milwaukee & St. Paul, the Chicago, Rock Island & Pacific, the Oakland, Antioch & Eastern, the San Francisco-Oakland Terminal, the Montreal & Southern Counties, the Atchison, Topeka & Santa Fe, the Lehigh Coal & Navigation Company, the Scranton & Binghamton, the Cumberland Valley and the Cincinnati, New Orleans & Texas Pacific.

The specifications cover impedance bonds, electric alternators, reactors, resistors, single-phase line transformers and other details. All were accepted and ordered to letter ballot, except the "general clauses to be used in unit specifications" (page 488, September Journal) which were referred back to the committee.

Committee No. 7, E. G. Stradling (C. I. & L.) chairman, reported on a proposed standard 2-ohm track relay, having made a study of resistances which has been discussed at previous meetings; but, after considerable discussion and much objection to displacing 4-ohm relays without further study of conditions on railroads in all parts of the country, the report was referred back.

The Committee on Electrical Testing, P. M. Gault (Ill. Cent.) chairman, recommended the adoption of the data published last March on Ranges and Scales for Electrical Instruments, and a form for recording results of tests. Both were accepted after brief discussion, and referred to letter ballot.

The report of Committee No. 5, presented by L. R. Mann, (Mo. Pac.) vice chairman, included a revised code of instructions for maintenance of alkaline storage batteries, which was accepted without discussion and ordered referred to letter ballot.

The special committee on Lightning Protection, E. G. Hawkins (N. Y. C.) chairman, presented a revised specification for ground apparatus for lightning arresters which, after brief discussion and one or two slight alterations, was accepted and ordered to letter ballot.

The Board of Direction reported that a committee had proposed three cities, Chicago, St. Paul and Cleveland, one of which should be selected as the place for the next annual meeting; but it recommended that, because of war conditions, no selection be made at this time; and the meeting left in the hands of the board all questions concerning next year's meetings (March, June and September).

The election of officers of the Association for the ensuing year resulted in the unanimous choice of the following: President, William H. Elliott (N. Y. C.); second vice-president, C. J. Kelloway (A. C. L.); secretary and treasurer, C. C. Rosenberg, Bethlehem, Pa.

THE PARIS NORTH-SOUTH RAILWAY.—Out of 962 employees on the Paris North-South Railway in 1916, 341 were women. The number of passenger tickets issued in that year was the highest on record, being 66,658,066, as against 54,630,529 in 1915 and 56,388,123 in 1913. At the St. Lazare station alone 7,000,405 tickets were sold.

General News Department

A roundhouse of the Delaware, Lackawanna & Western at Scranton, Pa., was damaged by fire September 13, and 14 locomotives were seriously damaged.

Settlement of a strike of approximately 1,500 clerical workers of the Seaboard Air Line was announced Tuesday to have been effected by the Department of Labor.

Station employees on the Boston & Maine Railroad met Monday and voted to demand an increase in pay. They want eight cents an hour more than they are receiving and a reduction in the amount of work required of them.

A fire started last Saturday night in the interior of the Winchester Bridge tunnel on the Georges Creek and Cumberland branch of the Western Maryland. Both ends of the tunnel were closed in the hope of smothering the fire.

Telegraphers on the Chicago, Burlington & Quincy have taken a strike vote. Their demands include a 25 per cent increase in wages, time and a half for overtime, extra pay on Sundays and certain vacation privileges. Strike agitation by telegraphers on the Illinois Central has resulted in the mediation of the differences between the men and the road.

The Brotherhood of Railroad Trainmen has presented demands to six middle-western roads for an increase of \$10 a month in the compensation of passenger brakemen and baggage men, dating from September 1. The roads affected are the Chicago & North Western, the Chicago, Burlington & Quincy, the Illinois Central, the Chicago Great Western, the Chicago & Alton, and the Chicago, Rock Island & Pacific.

At the time of writing the strike of freight handlers and freighthouse clerks at Kansas City had not yet been settled. The Atchison, Topeka & Santa Fe, and the Chicago, Burlington & Quincy had nearly full forces of men at their respective freight houses, while the Chicago, Rock Island & Pacific had about 10 per cent of the usual number of men at work, and the freight-houses of the other roads were closed. Switchmen and teamsters are threatening to call sympathetic strikes.

Cameron B. Buxton, former general agent of the Atchison, Topeka & Santa Fe at Philadelphia, and since last fall vice-president of H. L. Edwards & Co., cotton merchants of Dallas, Tex., has been appointed assistant director of the section of transportation of the United States Food Administration. This section is under the direction of Edward Chambers, vice-president of the Santa Fe, his services having been given free to the Food Administration by the railroad. Mr. Buxton's services have also been donated by his company.

A strike of shopmen of the Kansas City, Mexico & Orient was settled through mediation on September 14, following conferences between committees representing the shop crafts and officers of the road. The men had asked for a 10-cent increase in wages, and were offered an increase of two and one-half cents an hour by the company. The compromise agreement, which was reached on September 14, provides for an increase of from three to six cents an hour for mechanics, helpers and car-men, and two and one-half cents for apprentices. The men had been off work for nine days.

Press despatches from Petrograd dated September 18 said that David R. Francis, the American ambassador, had authorized the announcement that he has received a promise by the Russian government that the recommendation of the Stevens commission concerning transportation improvements will be carried out immediately. John F. Stevens and the others in his party are on a three weeks' tour of Siberia in company with Russian officials, who have been instructed to make the improvements suggested by the commission. The ambassador says that the carrying out of the commission's suggestions will improve the carrying capacity of the trans-Siberian Railroad 30 per cent.

Five More Engineer Regiments

Recruiting officers in several of the large cities of the country are advertising for recruits for five additional engineer regiments, one of which, the 21st Engineers, will be for constructing light railways. The remaining four include the 20th, forestry; the 23rd, highway; 25th, construction, and the 26th, supply and water supply. For the 21st, the light railway, men trained in the following trades are wanted: Timbermen, bridge carpenters, masons, pipe fitters, steam fitters, hoisting engineers, firemen, dinkey runners, teamsters, track layers, construction foremen, pile drivers, concrete foremen, telegraph linemen, riggers, cooks, machinists, blacksmiths, transitmen, surveyors, draftsmen, storekeepers, machine repairers, clerks, electricians, oilers, painters, rod drillers, powdermen, signal installers and bridgemen.

Seven Killed in Burlington Wreck

In a rear-end collision of two stock trains on the Chicago, Burlington & Quincy at 11:05 p. m., September 16, near Earlville, Ill., seven stock men were killed and six were injured. The men were riding in the first coach ahead of the way car of the foremost train when the train behind, which had run past a block signal and flagman, crashed into it. Five of the men were killed instantly, and two died later at a hospital in Aurora. When the engineer of the second train saw the crash was inevitable, he jumped from the engine, thereby sustaining slight injuries. Preliminary investigations by the company tend to show that the accident was caused by the fact that the engineer of the second train was asleep until his train was too close to the preceding one to prevent the accident. He, in fact, admitted that he was not fully awake at the time, and attributes his drowsiness to having taken some medicine to cure a cold. Traffic to Chicago was tied up for several hours following the wreck.

Loyal Union Men Protected by Court

Twenty-two members of the Chicago lodge of the Brotherhood of Railroad Trainmen have found it necessary to appeal to a court for protection of their membership rights because, they maintain, they remained faithful to a promise made by the brotherhoods to Congress in January. According to their contention, when the committee on interstate and foreign commerce of the House of Representatives was considering the advisability of giving the President the power to force trainmen to remain at their posts in the event of a strike, representatives of the brotherhoods agreed that if such authority was withheld, the men they represent would be found loyal to the government, and would do nothing to interrupt the operation of trains in case of threatened or actual warfare. Among those who, they assert, gave this guarantee to the government was W. G. Lee, president of the Brotherhood of Railroad Trainmen. About six months later, when he was dangerously ill, 2,500 Chicago switchmen, under the orders of James Murdock, vice-president of the B. of R. T., struck, thereby tying up movements of troops and government supplies. It is Murdock's contention that Thomas Dodge, acting president in place of Lee, gave him authority to order a strike. As a matter of fact, Dodge did give the order, but later rescinded it before the strike went into effect. In the face of the obvious illegality of the strike, 22 switchmen in the employ of the Illinois Central recently had charges preferred against them by the Chicago lodge of the B. of R. T., stating that by refusing to obey the strike order they made themselves liable to expulsion from the union. Upon application to the courts they secured an injunction preventing the Chicago lodge from taking any action to prejudice their membership rights on the grounds that only the grand lodge has the authority to expel members, and that the strike order which the men disobeyed was in itself a violation of the brotherhood's constitution, as it had been given in direct contravention of the order of the president of the union.

Stockholders Asked to Express Opinions

"The co-operation of the stockholders is earnestly invited to continue the successful practice established three years ago of making the annual meeting not merely a conventional routine, but a forum for the expression of the views of individual stockholders upon the policies and problems of the company." This statement is contained in a letter which has been forwarded to the stockholders of the Southern Railway by President Fairfax Harrison, giving notice of the annual meeting of stockholders to be held in Richmond, Va., on October 9. The letter states that the principal officers of the Southern will be in attendance to answer questions directed to the management, or to any detail of the company's business, and adds: "You are earnestly invited to attend in person; or, if that shall be impossible, to have your own personal representative in attendance in your behalf, or to address to the undersigned in writing what you might say if present."

Exemption Boards Praise Roads

The military exemption boards in northern Illinois districts have strongly commended the railroads for their "unselfish patriotism" in closely limiting claims of their employees for exemption from military service. R. H. Aishton, president of the Chicago & North Western, and chairman of the central department committee of the Railroads' War Board, promptly notified the exemption boards that the railroads would not ask for exemption for employees by classes, nor would requests be made for individual exemptions unless necessary for the successful operation of the roads. Each road designated one of its highest officers as exclusively authorized to approve claims of employees for exemption.

"This action of the railroads established a precedent, which has been followed by all other large employers of labor," said H. H. Merrick, chairman of the consolidated exemption boards of Illinois. "This policy assured the best results possible for the employer, the employee and the nation. . . . The railroads are deserving of full credit."

Tobacco for the Men in France

Every Pennsylvania Railroad man who goes to France with the army, who joins the marine corps, or enlists in the navy, will, from time to time—probably as often as once a month—receive from another Pennsylvania Railroad man, at home, a package of tobacco and cigarettes. Each package will contain a self-addressed post-card from the employee whose contribution provided the gift.

This arrangement has been made possible by the establishment of the Pennsylvania Railroad Tobacco Fund. More than 2,500 employees of the Lines East of Pittsburgh have already enlisted. Some of them are in France now; others are on their way; the remainder are preparing to go. The object of the fund is to maintain personal contact and the spirit of fellowship between those who go and those who stay.

Every contribution of 25 cents provides for a package of "smokes," which would cost 45 cents retail at any cigar store. For each 25-cent contribution the giver signs and addresses a post-card, which will be enclosed with one of the packages. The recipient is expected to put his own name on the card, perhaps write a brief message, and send it back by the next mail.

American Gear Manufacturers Meet

The American Gear Manufacturers' Association held its semi-annual session in Chicago, September 13, 14 and 15.

F. W. Sinram, of Van Dorn, Dutton & Co., Cleveland, O., president of the organization, opened sessions Friday morning. A paper on Advertising Don'ts was then read by J. C. McQuiston, advertising manager of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. W. H. Phillips, of the R. D. Nuttall Company, Pittsburgh, followed it with a talk on the Heat Treating and Hardening of Gears.

In the afternoon the convention men were the guests of Chicago members. An automobile trip of about 75 miles through Chicago's park system was made.

On Saturday, a paper by B. S. Waterman, of the Brown & Sharpe Manufacturing Company, on Inspection of Gearing, was read; also another by H. E. Eberhardt, of the Newark Gear Cutting Machine Company, on Spur Gearing by the Rotary or

Disc Cutting Process; and another by F. Schneider, of Van Dorn, Dutton & Co., Cleveland, on Spur Gears by the Shaper Method.

The Bridge and Building Convention Exhibit

Although the exhibit of the Bridge and Building Supply Men's Association, held in connection with the annual convention of the American Railway Bridge and Building Association, is almost a month in the future, 15 firms have made reservations of space, a larger number than at this time in any previous year. An interesting feature of this year's exhibit is the fact that a number of the firms which have already reserved space have indicated their intention of making more elaborate exhibits than previously, and have asked for larger allotments. It is expected that at least 30 to 40 companies will present exhibits.

Among the firms which have already reserved space are the following:

American Hoist & Derrick Co., St. Paul, Minn.
American Valve & Meter Co., Cincinnati, Ohio.
Carbic Mfg. Co., Duluth, Minn.
Chicago Bridge & Iron Works, Chicago.
Detroit Graphite Co., Detroit, Mich.
Paul Dickinson, Inc., Chicago.
Fairbanks, Morse & Co., Chicago.
H. W. Johns-Manville Co., New York.
The Lebon Co., Chicago.
C. F. Massey Co., Chicago.
Mudge & Co., Chicago.
George P. Nichols & Brother, Chicago.
Patent Vulcanite Roofing Company, Chicago.
Standard Asphalt & Refining Co., Chicago.
Simmons-Boardman Publishing Co., New York.
Texas Co., Houston, Texas.
U. S. Wind Engine & Pump Co., Batavia, Ill.
Western Roofing & Supply Co., Chicago.

Railway Fire Protection Association

The fourth annual meeting of the Railway Fire Protection Association will be held at the Planters Hotel, St. Louis, Mo., October 2, 3 and 4.

The opening session will begin at 10 a. m. on October 2.

The afternoon session will be devoted to the presentation and discussion of the report on Statistics, E. B. Barry, of the Southern Railway, chairman, and to a discussion of a number of miscellaneous fire dangers and hazards.

At the morning session on October 3, reports will be presented by the following committees:

Handbook on Railroad Fire Prevention and Protection; C. N. Rambo, Norfolk & Western, chairman.

Fire Prevention and Protection in Terminal Classification and Storage Yards; F. A. Greene, Pennsylvania Railroad, chairman.

Electrical Hazards; T. S. Potts, Baltimore & Ohio, Chicago Terminal, chairman.

Locomotive Spark and Ash Pan Hazard; E. C. Sasser, Southern Railway, chairman.

At the afternoon session reports will be submitted by the following committees:

Wharves and Piers; W. F. Hickey, New York, New Haven & Hartford, chairman.

Fire Protection in Passenger Equipment; G. L. Ball, St. Louis-San Francisco, chairman.

Explosives and Other Dangerous Articles; W. S. Topping, Bureau of Explosives, chairman.

At the morning session on October 4, there will be presented a committee report on Hose and Hose Couplings; F. H. Elmore, Southern Railway, chairman. A paper will be read on Hazards in Connection with Storage of Pulverized Coal, by C. P. Beistle, chemist with the Bureau of Explosives; and motion pictures will be shown illustrating fire prevention on the Baltimore & Ohio.

Railway Club of Pittsburgh

At the first regular meeting of the Railway Club of Pittsburgh, after the summer vacation, to be held on September 28, at the Commercial Club Rooms of the Colonial Annex Hotel, Pittsburgh, A. L. Humphrey, vice-president and general manager of the Westinghouse Air Brake Company, will present a paper entitled Ammunition Problems in War Time. This paper will be illustrated by lantern slides and moving pictures, and is devoted to problems arising in the manufacture of ammunition in quantities necessary to equip and maintain a large army and the effective mobilization of our material and industrial resources for that purpose.

The Railway Real Estate Association

The 1917 convention of the Railway Real Estate Association, which was to have been held in Duluth, Minn., this coming October, has been postponed.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Next meeting, October 16-17, St. Louis.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 16-18, 1917, Chicago.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, Rooms 1116-8 Woodward Bldg., Washington, D. C. Next meeting, September 26, Congress Hotel, Chicago.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual dinner, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

CINCINNATI RAILWAY CLUB.—H. Boutet, Chief Interchange Inspector, Cin'ti Rys., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 568 Union Arcade Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INVESTMENT BANKERS' ASSOCIATION OF AMERICA.—Frederick R. Fenton, 11 W. Monroe St., Chicago. Annual convention, October 1-3, 1917, Baltimore, Md.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—F. W. Hager, Fort Worth & Denver City, Fort Worth, Tex. Next convention, October 16-18, 1917, Cleveland, Ohio.

NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS.—Jas. B. Walker, 120 Broadway, New York City. Next annual convention, October 16, 1917, Washington, D. C.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAB MEN'S ASSOCIATION.—Geo. A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PACIFIC RAILWAY CLUB.—W. S. Wollner, Assistant to Chief Engineer, Northwestern Pacific R. R., San Francisco, Cal.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—F. C. Stewart, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Pittsburgh Commercial Club Rooms, Colonial Annex Hotel, Pittsburgh.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, office of the president's assistant, Seaboard Air Line, Norfolk, Va. Next meeting, October 2-4, 1917, St. Louis, Mo.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, Assistant Engineer, C. & O., Richmond, Va. Next convention to have been held October, 1917, Duluth, Minn., indefinitely postponed.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTER'S AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W., Sterling, Ill. Next annual convention, September 18-21, 1917, Hotel Auditorium, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Fraenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, N. & W., Philadelphia, Pa. Next annual convention, October 16-18, St. Louis, Mo.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grand Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Gen'l Ag't, Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Monday in month, except June, July and August, Hotel Sherman, Chicago.

WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, Acting Secretary, 1735 Monadnock Block, Chicago, Ill. Regular meeting, first Monday in month, except January, July and August. Extra meetings generally on other Monday evenings except in July and August.

Traffic News

The Railroad Commission of Louisiana issued an order on September 11, modifying the average demurrage agreement to conform with the average agreement in force on interstate commerce.

Under a decision handed down September 15 by the New Jersey Board of Public Utility Commissioners, the Pennsylvania, the West Jersey Seashore, the Philadelphia & Reading and the Atlantic City Railroads are allowed to make increases in commutation fares and excursion or round trip tickets applying on intrastate trips in southern New Jersey.

A revision of class rates and a 15 per cent increase in freight rates proposed by Ohio railroads were suspended on September 13 for 30 days by the Public Utilities Commission of Ohio. The railways in Missouri recently filed a request with the Missouri Public Service Commission to have their application for a general 15 per cent increase in freight rates postponed indefinitely.

J. B. Jemison & Co., lumbermen of Thomasville, Ga., have issued to dealers a striking appeal for conservation of freight cars. Pointing out that the average capacity of box cars is 40 tons, and that the average load is only 17 tons or 43 per cent of capacity, everybody is urged to utilize the 57 per cent of facilities available, but not used. "It is, therefore, not only the patriotic duty of every lumberman, but it is to our own advantage, and a matter of plain, common, every-day, business sense, to: Load every car, every time, to full capacity, and load them quick. Put on every foot, every time, that every car will carry, and do it quick. . . ."

The Buffalo, Rochester & Pittsburgh and the New York, New Haven & Hartford have announced plans for "sailing days" on 1. c. 1. freight. On the Buffalo, Rochester & Pittsburgh, stations have been divided into five classes, according to the importance and the amount of traffic moving to them. The days on which freight will be received for certain stations and the leaving time of the train on which such freight will be sent forward are given in a pamphlet just issued to shippers. For certain points freight will be received daily, for others daily except Saturday, for a third class except Saturday and Monday, for a fourth class on Monday, Wednesday and Friday, and for a fifth class on Tuesday, Thursday and Saturday.

Adams Express Declares Two Days' Embargo to New England Points

The Adams Express Company announced Tuesday that it had declared an embargo, effective Thursday and Friday of this week, on express shipments in both directions between New York City, Brooklyn, Jersey City and Hoboken and all points on its lines in New England, except Government shipments and foodstuffs.

The reasons given are the unprecedented volume of matter offered for movement by express, rendered more acute by the heavy movement of Government shipments, as well as the restriction of express equipment, due to the handling of large troop movements and their accompanying impedimenta.

The Movement of Selected Men to Cantonments

It will take all of the 1,500 "tourist" sleeping cars available and 5,000 coaches to transport the 194,800 men, who constitute 40 per cent of the citizen-soldiers selected for military service, and who are being moved from their homes to the 16 cantonments of the government during a five-day period, which began on September 19. Publication of any routes or schedules of military movements is prohibited, but it can be said that the government and the railroads have co-operated in making every possible provision for the safe, comfortable and prompt transportation of the citizen-soldiers. Generally speaking, the "tourist" sleeping cars will be used by those located farthest from the cantonments, while the day coaches will be used for the shorter trips. All arrangements are made for stops for meals en route, wherever necessary.

Unlike movements of the "regulars" or national guards, the citizen-soldiers will not be accompanied by officers. The various examining boards throughout the country have notified each man the exact date he is to travel, where he is to take a train, the number of the train and its time of departure. These boards have also designated one man who will be in charge of each lot of men entraining at each place during the five-day period. The number of men to assemble daily at each place of entrainment ranges from two to several hundreds. The men from the smaller places will be carried on regular trains. Extra coaches will be added as more detachments are picked up. When the extra coaches reach a certain number they will be detached from the regular trains and made up into special trains. Each "tourist" sleeping car will carry 40 men, and the average in each day coach will be 50 men. From the larger cities the men will travel all the way in special trains, as a rule.

Navy to Help the Car Loading Campaign

The Bureau of Supplies and Accounts, Navy Department, has issued instructions to navy contractors concerning car supply and expeditious freight movements. Paymaster Gen. Samuel McGowan has called special attention to the fact that in the existing emergency it is necessary that there be no delay to matters in which the navy is interested, and advises contractors of the methods to be followed to hasten shipments for the navy. It is essential that contractors endeavor to have cars placed or consignments accepted and moved before requesting assistance from the government. If after reasonable effort on the part of the contractor it is impossible to secure car equipment, they are to advise the Bureau of Supplies and Accounts. It is important that cars be loaded to full capacity. Also that equipment be promptly unloaded and released. Effective co-operation on the part of all concerned will materially assist in relieving the car shortage situation and congested traffic conditions.

Aishton Points Out Great Increase in Freight Traffic

The magnitude of the increases which have taken place in the freight traffic of the railways of the United States within the last two years, and of the advances in efficiency which have had to be achieved in order to handle it, were shown in a striking manner by R. H. Aishton, president of the Chicago & Northwestern, in an address before the St. Louis Railway Club, at St. Louis, Mo., on September 14.

"At the present rate of movement," said Mr. Aishton, "the railways will handle 510,000,000, or 52 per cent, more tons of freight in 1917 than they did in the fiscal year ended on June 30, 1915. On the basis of the present number of tons handled per train, it would take 720,000 freight trains, containing 18,000,000 freight cars, merely to handle this *increase* in tonnage over 1915. If all the cars required to handle this increase in tonnage were made up in a single train, that train would be 136,363 miles long."

Mr. Aishton gave another striking illustration to drive home the same point: "The increase in the freight traffic of our railways in 1917 over the year ended on June 30, 1915," he said, "will amount, at the present rate, to as much as the total traffic handled before the war by all the railways of Germany, France, Russia, Spain, Sweden, Switzerland, Roumania, Holland, Canada, South Africa, Mexico, Japan, Brazil and South Wales. In other words, the total ton-miles of traffic handled annually in those 14 countries before the war was 141 billion ton-miles, and at the present rate the increase in this year over the fiscal year 1915, in the ton-miles handled by our railways, will be just about 141 billion ton-miles."

Marketing Grain at Country Points

The United States Department of Agriculture has issued Bulletin 558, on marketing grain at country points, which contains much information of interest to producers, shippers, dealers and consumers. The government investigators declare that the producer of high-quality grain often receives less than it is worth in order that the buyer may pay an equal price to a grower of grain of inferior quality. If the farmer would clean his grain he could not only demand top prices, but would thereby obtain screenings worth \$10 to \$25 a ton for feed. Many elevators are open only during the harvest season; but farmers should encourage elevators which remain

open and provide a local market throughout the year. To determine for or against storage of grain on the farm, it is necessary to consider the interest on the investment, interest on the grain in store, natural shrinkage and loss by rodents, convenience of marketing, condition of roads at time of delivery, price at harvest time, and the probable price at some future date.

Car Shortage Again Reduced

Reports to the American Railway Association show that on September 1 the excess of unfilled orders for cars in some parts of the country over surpluses of cars in other places was 31,591, a reduction of 14 per cent, as compared with the previous month.

In the latter part of April, when the Railroads' War Board was organized to co-operate with the government in all matters of the railroads affecting the conduct of the war, there was an excess of unfilled car requisitions over surpluses amounting to 148,627 cars.

As it was impossible to create cars over-night, not to mention locomotives, terminal facilities, tracks and other facilities just as badly needed, the War Board directed its first efforts at securing greater use of the facilities which existed, mainly freight cars. The object was to more nearly take care of all the orders of the government and shippers as well. Railroads were instructed to do things within their own province which would increase the efficiency of equipment and at the same time to secure the co-operation of shippers, consignees and commercial bodies.

The success of the combined efforts of state and federal regulating bodies, shippers, commercial organizations, the railroads and seasonable weather, may be seen from the fact that the railroads have, with practically no increase in facilities, handled the greatest amount of freight in their history in the past four months.

The excess of unfilled car orders has been cut down from 148,627 on May 1, to 106,649 on June 1, to 77,682 on July 1, to 37,062 on August 1, and to 31,591 on September 1, thus achieving an improvement in four months of 78 per cent.

President Holden Warns Public to Ship Now

A warning to buyers and shippers generally, but especially those of the central and western states, to ship all the freight they can now, was issued on September 15 by Hale Holden, president of the Chicago, Burlington & Quincy, and one of the five members of the Railroads' War Board. "The time to make hay is when the sun shines, and the best time to ship, under such conditions as those now existing, is when the railways have cars and the weather is good," he said. "The situation as to car supply is good now—better than at any time since the war began. In other years when there have been congestions of traffic they have usually begun about the middle of October, for that is when the movement of traffic normally becomes the heaviest. The same conditions, only intensified, may be expected this year. Hence, during the next few weeks, while the railroads have the cars and locomotives available, and while weather conditions are most favorable, every ton of freight that can be shipped should be."

"Fairfax Harrison, chairman of the Railroads' War Board, has just issued an appeal to farmers to send their wheat to market now, so that the railroads can transport it to storage points for ready distribution, and to mills to be made into flour for domestic use and for export to our allies, whose great needs can be supplied promptly because ships are available to our various ports. He points out that as the President has fixed the price of wheat for a year, the farmer can lose nothing now, while by holding his grain back he would lose interest on money and by deterioration of the grain."

"I would especially urge now the shipping not only of wheat, but of all commodities that can be shipped, and especially of coal. The railroads are now able to fill practically all orders for cars for coal. In fact in the past few weeks they have furnished more cars to mines in Illinois than have been loaded. There has been a marked reduction in the output of Illinois coal, due to labor troubles and other conditions for which the railroads are not responsible. They should not be blamed later for a coal shortage due to failure to ship coal at this time when the roads have enough engines and cars with which to move it."

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The hearing on the valuation of the Kansas City Southern announced for September 18 at Kansas City before Examiner John H. Gray was cancelled and a hearing assigned for October 8.

The Interstate Commerce Commission has suspended until December 30 a number of additional tariffs filed by the railroads in the eastern commodity rate case, together with some additional tariffs in the eastern live stock and fresh meat case. The tariffs were to become effective on September 15 and later dates.

The commission also suspended until January 13 proposed increases on commodities between trunk line territory and western points rates, on canned fish from New England points by rail and water to southern points, transcontinental rates on bottles westbound, and proposed increased charges for car float service in New York harbor.

H. C. Barlow, traffic director of the Chicago Association of Commerce, and chairman of the executive committee of the National Industrial Traffic League, who has been in Washington during the summer collaborating with the Division of Car Service of the Interstate Commerce Commission, has completed his work in Washington and returned to Chicago.

The commission has made public a tentative opinion in the western trunk line iron and steel case, holding that the proposal of the carriers to increase or cancel practically all commodity rates on iron and steel articles applying within western trunk line territory, and from points east of Chicago and the Mississippi river to points in western trunk line territory, are found generally not justified, but authority is given to publish somewhat higher rates than are at present maintained. The suspended schedules are required to be cancelled.

Reconsignment Case

The commission has made public the tentative opinion of Attorney-Examiner C. V. Burnside in the case involving changes in the regulations affecting the diversion or reconsignment of carload shipments proposed by practically all steam roads in the country. The proposed tariffs are upheld in many particulars, but many modifications are also ordered and the suspended tariffs are required to be cancelled. The findings in the tentative opinion are as follows:

1. The service of reconsignment is necessary, and should be provided for by the carriers at charges based upon cost, including a reasonable profit. Previous findings of the commission are reaffirmed. Undue detention of cars at point of reconsignment should be prevented by regulations which may include penalty charges.

2. The definitions of diversion or reconsignment should be clarified, and certain proposed rules should be so amended as to express the intent of the carriers, as shown by the record.

3. Proposed charges for change in the name of consignor not justified.

4. Proposed charge of \$2 per car for reconsignment in transit prior to arrival of shipment at original destination justified.

5. Proposed charge of \$2 per car for reconsignment at original destination on order received by the carrier in time to permit instructions to be given to yard employees prior to arrival of shipment not justified.

6. Proposed charge of \$2 per car for stopping carload shipments in transit to be held for orders prior to reaching original destination justified.

7. Proposed charge of \$5 per car for reconsignment at original destination on orders received by carrier after arrival or too late to permit instructions to be given yard employees before arrival justified; but carriers should give shippers advance notice of arrival at reconsigning points of shipments extraordinarily delayed.

8. Proposed charge of local tariff rates for movement of

carload shipments within switching limits after placement for unloading justified.

9. Proposed charge of \$2 per car for reconsignment within switching limits before placement for unloading on orders received within 24 hours after arrival justified.

10. Proposed charge of \$5 per car for reconsignment within switching limits before placement for unloading on orders received more than 24 hours after arrival justified.

11. Proposed application of charge for reconsignment service regardless of method of freight rate construction justified.

12. Proposed regulations prohibiting reconsignment to a point or points formerly under embargo, when the shipments are forwarded from point of origin prior to termination of embargo, justified.

13. Application of the proposed regulations to the reconsignment of shipments of coal not justified on the record.

14. Proposed regulations for reconsignment of grain at Pittsburgh disapproved as unduly prejudicial to Pittsburgh.

15. Proposed increases in charges for reconsignment by certain New England carriers not justified.

16. Respondent should provide by tariff for relief from reconsignment charges when reconsignments are necessitated by embargoes or by confiscation of coal.

17. Tariffs under suspension required to be cancelled, but without prejudice to the right of carriers to file new tariffs in conformity with the views expressed.

COURT NEWS

Crossing Accident—Contributory Negligence of Team Driver

The Kansas Supreme Court holds that the rule that contributory negligence is not to be ascribed as a matter of law to one who, through bewilderment, makes an injudicious choice of a means of escape from a sudden peril does not apply in an action against a railroad for injuries resulting from a crossing collision, where the railroad's only negligence was running the train at 16 miles an hour across a city street, and the plaintiff, while driving his team at an ordinary walk, could have seen the train when it was 300 feet away and he was 22 feet from the track, and there was nothing to prevent his turning to one side except his fear and excitement.—Moler v. Rock Island (Kan.), 166 Pac., 488. Decided July 7, 1917.

Supplying Water From Streams to Locomotives

The Kansas Supreme Court holds that a railroad company, as a riparian owner, has the right to make reasonable use of the water of a stream for the purpose of supplying its engines and operating its road. Reasonable use means such use as is consistent with the equal rights of other riparian owners. Where water is abundant there is no occasion to dispute about its use. Only when the flow becomes scanty does necessity for adjustment arise. In this case matters were brought to a crisis by an unprecedented drought. The trial court found specifically that the railroad's dam did not back-water far enough to interfere with the operation of the plaintiff's up-stream mill, and that the quantity of water taken by the railroad did not in any appreciable degree affect the operation of the plaintiff's down-stream mill.—Atchison, T. & S. F. v. Shriver (Kan.), 166 Pac., 519. Decided July 7, 1917.

Safety Appliances

The Montana Supreme Court holds that under section 2 of the Safety Appliance Act of 1910, requiring that all cars subject to the provisions of the act be equipped with sufficient hand brakes, the absolute duty was imposed on the defendant railroad to furnish a car with the several parts of the hand-braking appliances so securely connected that the brakes could be set with safety in the ordinary routine of a brakeman's duties, and it being necessary to that result that the chain be hooked over the end of a rod, the duty was imposed on the railroad to see that such connection was made in the first instance, and the same high standard of duty continued to see that the chain and rod were connected securely at all times, so that it was liable for injuries to a brakeman proximately resulting from the breaking of a wire which was used to connect the rod and chain.—Armitage v. Chicago, M. & St. P. (Mont.), 166 Pac., 301. Decided June 28, 1917.

Equipment and Supplies

LOCOMOTIVES

THE NEW YORK CENTRAL has reserved space with the American Locomotive Company for about 250 additional locomotives.

THE NORFOLK & WESTERN is said to have reserved space with one of the locomotive builders for a number of large locomotives.

FREIGHT CARS

THE ANACONDA COPPER MINING COMPANY, Butte, Mont., is inquiring for 10 box cars.

THE SINCLAIR REFINING COMPANY, Coffeyville, Kan., is inquiring for 60 steel underframes.

THE TORONTO, HAMILTON & BUFFALO has ordered 5 caboose cars from the American Car & Foundry Company.

PASSENGER CARS

THE BROOKLYN RAPID TRANSIT is inquiring for prices on 250 street cars and 500 trucks.

IRON AND STEEL

THE PENNSYLVANIA has ordered 270 tons of structural steel from the Morava Construction Company, Chicago, for steel frames for four box-car unloading machines at the Northern Central elevator, Baltimore, Md.

THE JAPANESE IMPERIAL RAILWAYS.—An associated Press despatch from Seattle on September 19, said: Large quantities of old steel rails have been purchased in the Northwest by Japanese brokers and shipped to Japan, it was learned today. Twenty-three hundred tons of old rails have been shipped in the last few weeks, and additional shipments are being assembled. Brokers are paying \$70 a ton for the rails, which originally cost \$24 a ton. In turn they are selling them to the Japanese railroads for \$100 a ton.

CAPE TO CAIRO RAILWAY.—A special despatch from Elizabethville, Africa, to The African World announces the completion, in connection with the Cape to Cairo Railway, of the railroad to Bukama on the navigable Congo. The line now covers a distance of 2,700 miles direct from Cape Town via Rhodesia.

GREECE CONNECTED WITH CONTINENTAL EUROPE BY RAIL.—On May 8, 1916, the railway was completed between Gilda, on the Saloniki-Monastir line, and Pappapuli, on the Thessalian frontier, a section of 56 miles, linking Greece with the rest of Europe. After the war through trains will be run from Paris to Athens-Piraeus, shortening the time to some 60 hours.

REPORT OF SOUTH AFRICAN RAILWAYS FOR 1916.—The financial returns of the railways and harbors for 1916 show an increase in revenue of \$5,154,485 over 1915. Expenditures totaling \$15,335,670 were authorized for the railroads, of which \$6,377,388 was for capital, \$200,456 for betterment, \$8,388,619 for renewals, and \$330,275 for working purposes. Fifteen new locomotives—six standard and nine narrow gage—costing \$324,036 were placed in service, and for new passenger coaches and freight cars \$2,920,611 was expended. During 1916 heavy shipments of agricultural products and other requirements severely taxed the available rolling stock; the abnormal traffic necessitated the ordering of more equipment. On December 31, 1916, there were being built or ordered locomotives valued at \$5,207,647; passengers, coaches, \$2,207,143; and freight cars, \$4,107,476. The proposed electrification of South African railways again received consideration during 1916. On the recommendation of the railway board an English firm is to investigate and report upon the feasibility of electrifying certain sections of the system. This report is also to include the estimated cost of conversion, the benefits to be derived therefrom, and the effect upon operating costs.

Supply Trade News

George A. Turville, secretary and treasurer of the Crucible Steel Company, has also been elected a vice-president in addition. J. M. McComb, credit manager, has been made assistant treasurer.

Charles M. Terry, president of Charles M. Terry, Inc., has arrived in New York from Australia and will be temporarily located at the offices at 23-25 Beaver street. This company exports machinery and railway and engineering supplies.

The Hollow Tile Building Association, an organization composed of manufacturers representing 90 per cent of the total production of this burned clay product, has opened an office in the Conway building, Chicago. E. R. Sturtevant, who has been engaged in the manufacture of hollow tile, has been elected secretary and treasurer.

The Ransome Concrete Machinery Company, New York, has been reorganized and reincorporated as a new corporation with larger capitalization. It will enlarge and expand its business to include the entire line of building contractors' equipment, contractors' machinery, etc. Frank L. Brown is director and president, and John D. Givens, director and treasurer.

A. W. Ransome, who has been engaged for nearly 20 years in the development and manufacture of concrete machinery, has been appointed to the position of manager and chief engineer of the mixer department of the Blaw-Knox Company, Pittsburgh, Pa., which has taken up the manufacture of concrete machinery, developed during the past two years by Mr. Ransome.

The United States District Court for the Western District of New York has handed down its decision that the Gould "Simplex" system of electric car lighting is not an infringement of the Creveling patent, 747,686, owned by the Safety Car Heating & Lighting Company, and has directed that the suit be dismissed with costs to the Gould Coupler Company. This disposes of the last charge that the Gould "Simplex" system infringes any patent.

The Bradford-Ackermann Corporation, Forty-second Street Building, New York City, has been made the eastern sales office for the Young Brothers Company, Detroit, Mich. The sale of Young ovens, for japanning and drying purposes, will in the future be handled by this eastern office for the New England states, New York, New Jersey, Maryland, Delaware and eastern Pennsylvania. An engineering department will likewise be available for manufacturers in the East who are interested in quick drying and baking processes, and special oven designs will be offered to meet various requirements.

W. G. Dunham, since 1907 in charge of the manufacture of McCord & Co. products in Canada, with headquarters at Brantford, Ont., died September 8 at the age of 62 years. Mr. Dunham was born in Canada, and came to this country as a young man. In 1884 he entered the employ of the Chicago, Burlington & Quincy, and was with that road as foreman of the old Sixteenth street passenger yards of that company in Chicago during the Debs strike in 1894, when he succeeded in keeping his department operating without damage to railroad property. He entered the employ of McCord & Co. in 1902, and prior to his going to Brantford was mechanical inspector.

H. E. Hilts, district engineer at San Francisco for the Portland Cement Association of Chicago, has been elected general manager, with headquarters at Chicago, succeeding J. P. Beck, deceased. Mr. Hilts was born in New York and received his engineering education at the University of Pennsylvania. He began his business career with the Mexican International as a rodman, and later became associated with the Philadelphia & Western. For two years he was instructor in the engineering department of the University of Pennsylvania, which position he left to enter the service of the New York Central, where he remained until 1913. On the latter date he became road engineer of the Portland Cement Association, and in 1915 was appointed district engineer at San Francisco, which position he held until his recent promotion.

Railway Construction

CHESAPEAKE & OHIO.—Work is now under way on additions to the Russell, Ky., yard, calling for about 800,000 cu. yd. of earth excavation. The contractors are the Langhorne & Langhorne Company, Richmond, Va.

CHICAGO GREAT WESTERN.—A contract has been awarded by this road to T. S. Leake & Co., Chicago, for the construction of an 11-stall roundhouse at Clarion, Iowa. The structure will replace a 14-stall building, which was destroyed by fire last April.

DELAWARE & HUDSON.—This company is now at work building a new line to be used as third track from Schenectady, N. Y., to Richmondville Summit, about 12.59 miles. This is located on a new right of way not adjacent to the present right of way, as the line is being constructed on a maximum of 0.5 per cent grade compensated, and maximum curvature of four degrees, to be used as a north bound freight line on the Susquehanna division.

GREAT NORTHERN.—This company is contemplating the construction of a cut-off from the Willmar (Minn.) line to the Fridley terminals. No work is being done on the project at present, and none will be done in the immediate future.

NEW YORK, NEW HAVEN & HARTFORD.—Contracts have been given by this company to the Central Construction Company, Roxbury, Mass., for foundations for bridges, and to the American Bridge Company, New York, for the steel superstructures of bridges, in connection with the work of widening the present two-track South Boston cut to accommodate four tracks. The cut is about one-half mile long, and the work is so involved with operation that the larger part of it will be carried out by company forces. The improvements call for 120,000 cu. yd. of excavation and the construction of 20,000 cu. yd. of masonry; the cost of the work will be about \$1,000,000.

Railway Financial News

BOSTON & MAINE.—James H. Hustis, receiver, has been granted authority by Federal Judge Morton to expend \$365,000 for necessary improvements on the Fitchburg road, a leased line. This expenditure will be borne by the Fitchburg road, whose directors approve it.

CENTRAL VERMONT.—Howard G. Kelley, who was recently elected president of the Grand Trunk, has been elected a director and chairman of the board of the Central Vermont to succeed Edson J. Chamberlin, resigned.

COLORADO & SOUTHERN.—Howard Elliott and O. M. Spencer were elected directors to succeed Harry Bronner and H. E. Byram, resigned.

The directors have declared out of surplus earnings dividends of 2 per cent each on the first and second preferred stocks, both payable October 1 to stock of record September 21.

FITCHBURG.—See Boston & Maine.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—The directors were re-elected at the annual meeting September 18. The date of the annual meeting was changed from the third Tuesday in September to the third Tuesday in May, to correspond with the recent change in the fiscal year of the company.

MISSOURI, KANSAS & TEXAS.—See editorial comments elsewhere in this issue.

SOUTHERN RAILWAY.—A dividend of 2½ per cent on the preferred stock has been declared, payable November 20 to stock of record October 31. This is the first dividend declared on this issue since October, 1914.

Railway Officers

Executive, Financial, Legal and Accounting

B. B. Greer.—assistant to vice-president of the Chicago, Burlington & Quincy, at Chicago, has been elected vice-president and general manager of the Colorado & Southern, succeeding E. S. Koller, deceased.

William M. Doulin.—assistant treasurer of the Pittsburgh & Lake Erie, at Pittsburgh, Pa., has been appointed treasurer, succeeding J. G. Robinson, deceased, and J. S. McKibbon succeeds Mr. Doulin.

Howard G. Kelley.—president of the Grand Trunk and the Grand Trunk Pacific, has been elected also chairman of the board and member of the executive committee of the Central Vermont, vice Edson J. Chamberlin, resigned.

J. G. Rodgers.—general superintendent of the Northern division of the Pennsylvania Railroad at Buffalo, N. Y., has been appointed assistant to the president, effective September 20. Until otherwise ordered, he will continue to discharge his present duties in Washington as general agent of transportation for the Railroads' War Board of the American Railway Association.

William H. Biggar.—general counsel of the Grand Trunk, at Montreal, Que., has been appointed vice-president and general counsel in charge of all legal matters pertaining to the system.



W. H. Biggar

Mr. Biggar is also vice-president and director of the Grand Trunk Pacific and other associated companies. He was born on September 19, 1852, at Carrying Place, Ont., and was educated at Upper Canada College, Toronto. He entered the service of the Grand Trunk on February 1, 1881, and on December 31, 1902, was appointed assistant general counsel. About two years later he was appointed general solicitor of the same road, and on January 10, 1910, he was appointed general counsel of the Grand Trunk and the

Grand Trunk Pacific; in September, 1914, he was elected vice-president and general counsel of the Grand Trunk Pacific, with headquarters at Montreal, Que., and he also retained the position of general counsel of the Grand Trunk.

Operating

J. L. McKee.—has been appointed superintendent of the Buffalo division of the Delaware, Lackawanna & Western, with office at Buffalo, N. Y., vice F. M. Benning, resigned.

C. A. Hawkins.—has been appointed superintendent of the Nezperce division of the Nezperce & Idaho, with headquarters at Nezperce, Idaho. This division was recently acquired from the Lewiston, Nezperce & Eastern.

George A. Codling.—assistant division superintendent of the New York Central lines west of Buffalo, at Elkhart, Ind., has been appointed assistant superintendent of freight transportation, with headquarters at Cleveland, Ohio.

W. E. Morse.—general manager for the receivers of the Denver & Salt Lake, at Denver, Colo., has resigned, and the duties of that office have been assumed by W. R. Freeman, receiver. M. L. Phelps has been appointed superintendent, vice L. D. Blauvelt, resigned.

R. J. McCarty, Jr.—superintendent of the Delaware & Hudson at Oneonta, N. Y., has been appointed assistant to general super-

intendent of transportation, with headquarters at Albany, and J. K. McNeillie, general superintendent of the Canadian Government Railways at Moncton, N. B., has been appointed superintendent of the Susquehanna division of the Delaware & Hudson, with headquarters at Oneonta, vice Mr. McCarty.

A. J. Whitney, superintendent of the Maryland division of the Philadelphia, Baltimore & Washington at Wilmington, Del., has been appointed general superintendent of the Northern division of the Pennsylvania Railroad, with office at Buffalo, N. Y.; James Bucklew, superintendent of the Camden Terminal division and West Jersey & Seashore, at Camden, N. J., succeeds Mr. Whitney as superintendent of the Maryland division, and A. M. Parker, superintendent of the Allegheny division at Oil City, Pa., has been appointed superintendent of the Camden Terminal division and West Jersey & Seashore.

W. H. Fogg, superintendent of the northern and southern divisions of the Chicago, Indianapolis & Louisville, with office at Lafayette, Ind., has been promoted to general superintendent at Chicago, succeeding

P. L. McManus, resigned, effective September 7. Mr. Fogg was born at Milwaukee, Wis., on May 25, 1868, and entered railway service as a messenger boy in the train dispatcher's office of the Lake Erie & Western at Lafayette, Ind., on May 9, 1882. He was later promoted to train dispatcher in the same office, and in the early part of 1889 went to Mt. Carmel, Ill., as dispatcher of the Cairo, Vincennes & Chicago. From April, 1889, until September, 1889, he was dispatcher on the Toledo, St. Louis & Kansas City, and from the latter date until January, 1890, was dispatcher on the East Tennessee, Virginia & Georgia, now a part of the Southern Railway system, at Knoxville, Tenn. From January, 1890, to August, 1890, he was dispatcher on the Pittsburgh Western at New Castle, Pa., following which he worked for a month as dispatcher for the Chesapeake & Ohio at Clifton Forge, Va. He entered the service of the Monon as dispatcher on September 1, 1890. In May, 1905, he was promoted to chief dispatcher of the northern division, and in June, 1913, was appointed trainmaster of that division. He was promoted to superintendent of the northern division on January 1, 1914, and on January 1 of the following year had his jurisdiction extended over the southern division.

Traffic

J. G. Krener, chief clerk in the office of the general passenger agent of the Western Maryland, has been appointed assistant general passenger agent, with headquarters at Baltimore, Md.

W. E. Duperow, assistant general passenger agent of the Grand Trunk Pacific and the Canadian Government Railways, at Winnipeg, Man., has been appointed general passenger agent of both roads, with headquarters at Winnipeg.

T. D. Geoghegan has been appointed traffic manager of the Gulf, Mobile & Northern, in charge of freight, passenger and industrial departments, with headquarters at Mobile, Ala., vice W. L. O'Dwyer, who has been appointed general freight and passenger agent, with office at Mobile.

G. L. Oliver, assistant general freight and passenger agent of the Ft. Smith & Western, at Ft. Smith, Ark., has been promoted to general freight and passenger agent, with the same headquarters. A. R. Christie, general agent at Oklahoma City, Okla., has been appointed assistant general freight and passenger agent at Ft. Smith. J. J. Gibson, general freight and passenger agent at Ft. Smith, has been appointed general agent to the receiver, with headquarters at Oklahoma City.



W. H. Fogg

Engineering and Rolling Stock

H. A. Woods, assistant chief engineer of the Grand Trunk Pacific, with headquarters at Winnipeg, Man., recently resigned.

A. F. Stotler, supervisor of bridges and buildings of the Northern Pacific at Seattle, Wash., has been appointed division engineer of lines west of Ellensburg, Wash., with headquarters at Tacoma, Wash., vice B. L. Crosby, who has been granted an indefinite leave of absence on account of illness.

B. H. Davis, assistant master mechanic of the Delaware, Lackawanna & Western at Scranton, Pa., has been appointed master mechanic of Scranton, Syracuse & Utica and Bangor & Portland divisions, with jurisdiction over enginehouses and matters pertaining to road work, vice F. H. Reagan, resigned to accept service elsewhere; Charles W. McGuirk, general foreman in the motive power department at Scranton, has been appointed assistant master mechanic, succeeding Mr. Davis; and Joseph Greiser, general foreman in the motive power department at Scranton, has been appointed superintendent of shops, with jurisdiction over the Scranton locomotive shops.

Purchasing

C. N. Davids has been appointed purchasing agent of the Denver & Salt Lake, with headquarters at Denver, Colo., vice A. A. Dawley, assigned to other duties.

Special

Edgar S. Nethercut, who has been elected secretary of the Western Society of Engineers, Chicago, was born at Lake Geneva, Wis., on June 12, 1866, and graduated from the University of Wisconsin in 1889. From 1889 until 1893 he was employed as a draftsman by various companies, following which he was appointed chief engineer of the Paige Iron Works. In 1908 he became track expert in the valuation department, in charge of operation and sales, for the Public Service Commission, First district, New York, and three years later was engaged in the valuation of track for the Detroit United Railways. In the latter part of 1911 he opened offices in Chicago as a consulting engineer, and engaged in steam and electric railway valuation, reinforced concrete construction, sewer construction and building design. From 1914 to 1917 he was in charge of the valuation of track and rolling stock of the Washington Railway & Electric Company, Washington, D. C. On June 11, 1917, he was commissioned major in the Engineer Officers' Reserve Corps, from which position he resigned to become secretary of the Western Society of Engineers.

Railway Officers in Military Service

J. R. Jackson, assistant engineer of tests on the Atchison, Topeka & Santa Fe at Chicago, has received a commission as captain of ordnance in the Officers' Reserve Corps, but has not yet been assigned to active duty.

C. F. Stewart, general passenger agent of the Western Maryland at Baltimore, Md., has been granted leave of absence to serve with the Railroads' War Board at Washington, D. C. He will be in charge of work of furnishing loading for all movements of troops over the United States.

Joseph V. Reaph, confidential stenographer to W. W. Atterbury, vice-president of the Pennsylvania Railroad since 1909, has gone to France as secretary to Mr. Atterbury, whose appointment as director general of transportation of the American Expeditionary Force in France is announced elsewhere in this issue.

F. T. Bowles, formerly superintendent of the Lake Erie & Western and the Chicago, Indiana & Southern, and recently assistant superintendent of transportation of the San Antonio & Aransas Pass, has been commissioned as a captain in the Engineer Officers' Reserve Corps, and assigned to the Twenty-first Engineers (railways).

P. Topping and E. Wells, assistant engineers of the St. Louis-San Francisco at St. Louis, Mo., have received commissions as captain and first lieutenant, respectively, in the Engineer Officers' Reserve Corps. Captain Topping has been assigned to the Fifth Engineers, United States Army, and Lieutenant Wells has been detailed to Ft. Leavenworth, Kan.